INDIAN AGRICULTURE

Indian Agriculture

A Policy Perspective

B M BHATIA

Under the Auspices of the Centre for Policy Research
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Foreword

Indian agriculture has been India's mother economy. For thousands of years, India's civilisation has been built and has grown on the foundations of its agricultural economy. And even in the last years of the twentieth century, the agricultural sector accounts for over two-thirds of the employment of the Indian labour force.

The strides made by India in agriculture since Independence are undoubtedly impressive. To be self-sufficient in foodgrains over a short period of about thirty years is no mean achievement. However, India's population growth will not stabilise for quite some time. And the need for both growth in production and employment in the agricultural sector will be unabated.

What should be our policy perspective on Indian agriculture? This was the mandate we gave to B M Bhatia, one of the country's leading agricultural economists. Bhatia has prescribed a blend of policy shifts and high technology options to move towards agriculture in the twenty-first century.

Bhatia's policy recommendations deserve serious consideration by policy-makers, academicians in this sector and lay citizens interested in the future development of agriculture.

Centre for Policy Research
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January 1988

V A Pai Panandiker

Preface

It is not enough to view agricultural policy in terms of the achievement of a certain growth rate in the farm sector or the attainment of national self-sufficiency in food supply and raw materials for agro-based industries. Contributing around 40 per cent of the GDP and employing 67 per cent of the country's labour force, agriculture remains the mainstay of Indian economy to this day. The fortunes of agriculture not only affect but actually govern the fortunes of national economy.

This apart, rapid agricultural growth holds the key to the solution of the endemic socio-economic problems of rural poverty and unemployment confronting the country. In the peculiar circumstances of India, the development model based on the accelerated growth of the industrial sector for triggering the growth process of the whole economy could not have worked and has not worked. The much-vaunted trickle-down effect has not materialised. Rural India, except the irrigated agriculture regions, remains as poor and deprived as before.

The green revolution has solved the food problem of the country. It has helped to keep the growth rate of food production ahead of the demographic growth rate of the country. The result is that we have a comfortable level of buffer stock of foodgrains in the public sector. The agriculturists in the green revolution belt—extending from Punjab to west Uttar Pradesh through Haryana—has experienced an unprecedented measure of prosperity. The incidence of rural poverty and unemployment in the country is lowest in Punjab and Haryana.

The revolution has, however, remained confined to areas endowed with irrigation facilities. It has not touched rain-fed and

dry-land agriculture. This is because the high-yielding varieties (HYV)-fertilisers technology that wrought the green revolution is specific to irrigated agriculture. It is not relevant to the 70 per cent of Indian agriculture that is rain-fed. The latter needs a different type of technology or technologies. But the obsession with HYV-fertilisers technology has prevented adequate attention being paid to research in alternative technologies. Meanwhile, the incremental cost on agricultural returns (or ICOR) has started rising disconcertingly in the green revolution areas, with the result that the continued preoccupation with the technology in use at present has begun to be called into question in several quarters.

There have been other serious and unexpected fallouts of the green revolution. It has produced large imbalances in the cropping pattern and wide regional disparities in the agricultural sector in the country. It has helped to produce burdensome surpluses in some crops and painful shortages in others. We have bulging buffer stocks of wheat and rice but are spending a sizeable amount of precious foreign exchange on importing vegetable oil and sugar because our production of oilseeds and sugarcane falls short of the demand for these by the concerned industries. The production of coarse grains (that forms the staple diet of the poor in the countryside) and pulses (which are the main source of protein for the people in a predominantly vegetarian country) has considerably lagged behind the growth of population with the result that the per capita availability of pulses has almost halved in the last twenty years.

The income disparities between the developed and underdeveloped agricultural regions of the country have become so palpable that we can talk today of two Indias agriculturally, one dynamic and progressing, the other backward and stagnating. It is in the latter that little dent has been made into the basic problems of poverty, undernourishment and destitution.

All this would suggest the need for a change in the country's policies on agriculture. But several other factors have combined at the present juncture to make the need for such a change all the more urgent. The Seventh Plan has started running into difficulties on the resource front. Budget deficits and adverse trade balances have risen to untenable levels. Public sector enterprises have been found to be unable to generate resources for their own maintenance and expansion, leave alone contributing to the financing of

the developmental effort for the rest of the economy. The capital-output ratio continues to rise so disconcertingly that it threatens to lead the whole planning process into jeopardy. In the circumstances it has become all the more necessary to have a fresh look at the country's development strategy and the place that is to be accorded to agriculture in the development process.

It is with this purpose in view that this study on agricultural policy was undertaken. What are the problems and challenges facing the country in the development field in general and agriculture in particular, at the present juncture? What are the policy choices available and which of them should be preferred? What help can be given by ecology conservation measures and developments in emerging biotechnology for accelerating the agricultural growth rate in the country? These and other similar questions were posed and answers sought in the course of this study. This has been viewed in the perspective of the last fifteen years of the present century—1985 to 2000.

The first draft of this study was ready in October 1985 and circulated to experts and policy-makers in the Planning Commission and the Union Ministry of Agriculture as well as to academics working in the field of agricultural economics. Valuable comments were received, among others, from Manmohan Singh, Deputy Chairman, Planning Commission, and C.H. Hanumantha Rao, a noted agricultural economist and a member of the Planning Commission at the time. Later, a seminar on the study was organised at the Centre for Policy Research (CPR) in May 1986. Further suggestions and valuable comments were received at the seminar from M. Subramaniam, formerly Secretary, Ministry of Agriculture, V.G. Bhatia, Adviser, Planning Commission, G.R. Saini, Economic and Statistical Adviser, Ministry of Agriculture, and from several colleagues in the CPR like L.P. Singh and Nirmal Mukarji. The study has been revised in the light of all their comments. Of course, I alone am responsible for any deficiencies that may be still left in the study.

I would like to thank all the above mentioned persons for their pains in going through the earlier draft and giving me the benefit of their valuable advice. My special thanks are due to V.A. Pai Panandiker who invited me to undertake this study at the CPR and, throughout the course of the study, lent me his valuable support. I cannot adequately thank him for all this. I would also like to express my grateful thanks to my colleagues at the CPR, particularly Nirmal Mukarji, Pran Chopra, Bhabani Sen Gupta,

Isher Judge Ahluwalia and V.L. Rao, for several fruitful discussions I have had with them at various points in the course of the study. Equally, I am indebted to our young and dynamic librarian, Kamal Jit Kumar, for meeting my daunting demands for books and journals so promptly. Last but not the least, I would like to thank T. Rao and other supporting staff in the typing and computer units of the CPR for their unfailing support in typing the manuscript and seeing through the word processor its several drafts.

1

Introduction

Indian agriculture has recorded substantial growth during the thirty-five years of planned development starting with the First Five Year Plan in 1951–52. The index number of agricultural production, with the average of the triennium ending 1969–70 as the base, rose from 58.5 in 1950–51 to 138 in 1978–79 and 155.8 in 1983–84. During the same period, the index for foodgrain production rose from 57.1 to 139.3 in 1978–79 and 160.1 in 1983–84, while that for non-foodgrain items rose from 62 to 135.3 in 1978–79 and 146.7 in 1983–84. The overall annual compound growth rate of agricultural production in the country for the period 1949–50 to 1983–84 was 2.61 per cent and that of cereal production was 2.96 per cent. Contrary to general belief, the two growth rates during the period of the green revolution were a little lower than during the total period of thirty-four years taken together. Thus, the growth rate of total agricultural production in the period 1967–68 to 1983–84 was 2.59 per cent and that of cereal production 2.87 per cent (against 2.61 and 2.96 per cent, respectively, for the thirty-four year period).

Between 1950–51 and 1983–84 the production of foodgrains rose from 51 million tonnes to 152.4 million tonnes; sugarcane from 57 million tonnes to 177 million tonnes; cotton from 3 million bales (of 170 kgs each) to 6.58 million bales; jute and mesta from 3.3 million bales (of 180 kgs each) to 7.41 million bales; and that of the five major oilseeds from 5.2 million tonnes to 12.8 million tonnes. These increases are quite significant but do not measure up to

either the size of the resource allocations in the plans for the agricultural sector, or to the expectations aroused by technological advances in the farming sector made in the mid-sixties. The problem of food security has been solved in the sense that production increases have resulted in a situation where everyone in the country has *physical* access to food but food security (in the sense of providing everyone with *economic* access to food) remains a distant dream. The rate of agricultural growth achieved has been too inadequate to make any significant impact on the problems of poverty, unemployment and hunger. The gains in productivity have remained confined to select areas which have emerged as enclaves of high growth amidst stagnating, backward, and low-yield unproductive agriculture in the rest of the country. Consequently, India's agricultural economy has assumed a dual character. There is the green revolution belt in the north that has become the main supplier of grain to the government for running its public distribution system. Over 80 per cent of the supplies of grain to the public distribution system are now provided by the three northern states of Punjab, Haryana and (west) U.P. By focusing attention on this area in its development thrust and agricultural policy, the government has unwittingly fostered, agriculturally, the division of the country into the surplus and the deficit areas, the irrigated, green revolution belt representing the former and the rain-fed agriculture areas the latter. The result is that the country has today two agricultures—a modern, scientific and vibrant agriculture in the north and a traditional, unprogressive and staid agriculture in the other four regions (namely, the central, eastern, southern and western regions). Table 1.1, which shows the growth of yields of foodgrains for the twenty-year period 1960–61 to 1980–81 in different regions, illustrates the point.

In the northern region, the increase in yields between 1960–61 and 1980–81 was of the order of 125.6 per cent. The corresponding figures for the other regions are: central 36 per cent; eastern 22.7 per cent; southern 58.3 per cent; and western 31.6 per cent. The all-India average was 40.87 per cent.

During the same period, the increase in foodgrain production in northern India was 184.7 per cent; central India 52.75 per cent; eastern India 45.64 per cent; southern India 39.52 per cent; and western India 48.95 per cent. The all-India average increase was 58 per cent. Thus, the growth in foodgrain outputs in all regions other

Table 1.1
Foodgrain Yields (kgs per hectare)

Region	*1960–61*	*1970–71*	*1980–81*	*Annual Compound Rate of Growth 1960–61 to 1980–81 (%)*
Central	646	799	879	1.55
Eastern	878	943	1,077	1.03
Northern	862	1,489	1,945	4.15
Southern	738	952	1,168	2.32
Western	548	557	772	1.73
All-India	709	872	1,023	1.83

than the northern, was below the national average. The annual compound rate of growth in foodgrain output over the period in the northern region was 5.36 per cent compared to 2.14 per cent in the central, 1.86 per cent in the eastern, 1.70 per cent in the southern and 2.01 per cent in the western region. The annual compound growth rate of consumption of fertilisers over the same period in the northern region came to 16.29 per cent (against 9.85 per cent in the western, 6.54 per cent in the southern, 10.03 per cent in the eastern and 14.18 per cent in the central region).

The northern region covers the three states of Punjab, Haryana and west Uttar Pradesh. Table 1.2 shows the position of these states vis-a-vis the others with respect to irrigation and intensity of cropping.

It will be seen from the table that Punjab and Haryana are way ahead of the other states in terms of irrigated area, intensity of irrigation and cropping intensity. In the case of U.P., however, the position does not emerge so clearly. This is because it is only western U.P. which falls in the green revolution belt while the figures in the table relate to the whole of U.P. Among the southern states, Tamil Nadu shows the highest percentage of irrigated area and intensity of irrigation but not intensity of cropping.

Apart from severe regional disparities, production growth in this sector has been accompanied by serious distortions in the cropping pattern. In the foodgrains group, wheat has made the maximum gain. Its share in the total grain production of the country has gone up from 13 per cent during the First Plan period

Table 1.2
Irrigated Area, Intensity of Irrigation and Intensity of Cropping in 1978–79

State	*Irrigated Land as a % of Total Land Under Cultivation*	*Intensity of Irrigation (Gross Irrigated Area as Proportion of Net Irrigated Area)*	*Intensity of Cropping (Gross Cropped Area as Proportion of Net Cropped Area)*
Punjab	78.09	169	159
Haryana	52.55	155	151
Uttar Pradesh	50.86	119	139
West Bengal	26.88	103	142
Orissa	18.83	138	136
Bihar	34.69	125	133
Assam	21.35	100	124
Tamil Nadu	45.96	133	123
Andhra Pradesh	32.21	129	116
Kerala	10.34	155	131
Karnataka	13.66	122	108
Rajasthan	18.71	119	113
Gujarat	17.97	113	109
Maharashtra	10.39	122	100
Madhya Pradesh	13.66	104	115
All-India	26.56	127	123

to 28 per cent in the Sixth Plan. Rice has improved its position slightly; its share has gone up from 39 per cent to 41 per cent over the same period. On the other hand, the share of coarse grains went down from 32 per cent in the First Plan to 23 per cent in the Sixth Plan and that of pulses from 16 per cent to 8 per cent during the same period. Rice has been able to keep its position in the composition of total foodgrain production as a result of the contribution of the non-traditional areas of Punjab, Haryana and western Uttar Pradesh to the growth of rice production in the country. But for the performance of these agriculturally advanced areas, the growth rate of rice output would have been far more modest and the share of the crop in the total composition of foodgrain production would have declined. Thus, while the northern region is responsible for the greater part of the total growth of foodgrain output in the country during the last thirty-five years, over 80 per cent of the total increase in the cereal output during the period has been contributed by wheat and rice alone.

This has meant a switch in consumption from coarse grains to the two 'superior' grains—rice and wheat—by a large section of the rural poor who traditionally ate millet and maize. The production of coarse grains increased from 18.88 million tonnes in 1949–50 to 27.75 million tonnes in 1982–83 (an increase of less than 50 per cent over a period of thirty-three years) as against a 155 per cent increase in the total cereal production during this period. This change in the composition of cereal production in the country since Independence has great significance for anyone trying to understand or analyse the food and poverty problems of India. The rural poor were traditionally the major consumers of millet and other coarse grains. These were not only relatively cheaper than wheat and rice but, what is more important to note in the present context, were largely raised in the rain-fed and dryland areas by subsistence farmers for self-consumption. The substitution of wheat and rice for coarse grains in the staple diet of the rural poor thus means their being drawn into the money and market economy. This has far-reaching implications for food and price policies. The rise in foodgrain prices now affects the rural poor more adversely than before when they purchased only a little, if anything, of their food requirements from the market. Dharam Narain has demonstrated that the extent of poverty in rural India has come to be positively related to the level of prices and that inflation accentuates rural poverty. The relatively sluggish growth in the output of coarse grains and the consequent change in the proportion of various components in the total grain production of the country has given a new dimension to the problems of poverty, food supply and food prices.

Other disconcerting features of the emerging pattern are the virtual stagnation in the output of pulses and the serious lag in the supply of oilseeds compared to the rapidly rising demand for edible oils in the country.

Agricultural growth during the last thirty-five years has been characterised by (*i*) an increase in agricultural instability as reflected in the increased variance of yields from year to year after the introduction of new HYV seed-fertiliser technology; and (*ii*) a growth in imbalances and distortions in the cropping pattern.

The increased instability of production is attributed to the wide variance in yields rather than to the total failure of crops in a part of the country during years of adverse weather that would make a considerable difference to the total crop production. In the irrigated

areas of northern India and in the wheat and rice crops in these areas, the yield variance is small. But since a larger part of the total rice production of the country comes from rain-fed agriculture, the variance in the crop yields from year to year in this case becomes sharper than in the case of wheat. Taking rabi and kharif crops separately, the latter showed much wider variations than the former because wheat (which is the principal rabi cereal) is largely cultivated on irrigated land while rice (the principal kharif grain) is cultivated more in rain-fed areas and is, therefore, subject to greater fluctuations. Thus, the weather continues to be an important factor in determining the size of crop production in a year but the prices of fertiliser and its supply to the farmer, and the availability of electric power and diesel supplies for irrigation pumps have emerged as the new factors accounting for the increased variance in yield and crop production since 1966–67.

It may appear odd to talk of imbalances and distortions in crop production under planning. But the fact is that agricultural growth has brought these imbalances in its wake. The official annual *Economic Survey* for 1982–83 bemoaned:

> There also appears to be imbalances in the cropping pattern. For example, the country is faced with a substantial surplus of sugar and long-staple cotton.... On the other hand, in view of depletion of foodgrain stocks in 1979–80 and unfavourable weather conditions, the country had to undertake imports of food grains. At the same time we are also faced with the shortage of oilseeds and pulses.[1]

The Survey for 1984–85 while noting that 'the strategy followed so far has been amply rewarded' goes on, significantly, to add: 'However the imbalances persist region-wise and crop-wise.... Some areas show very substantial increases in yield rates while others have lagged behind.' And, while there were welcome gains in cereal production in 1983–84, 'large shortfalls relative to requirements continue in the production of oilseeds, necessitating bulk imports of edible oils. In pulses also there is a large gap between demand and supply.'[2] The Survey suggests that it is now desirable for the country to adopt a 'region specific strategy' to overcome the problem of regional imbalances in crop production. The same point was made by Manmohan Singh, Deputy Chairman, Planning

Commission, in his Panse Memorial Lecture for 1984. His remarks in this connection are so pertinent for evolving a future development strategy for agriculture that they will bear reproduction in full:

> Inter-state variations and inter-district variations in agricultural production (even under similar agro-climatic conditions) are indicative of the important role of sound management practices in promoting faster agricultural growth. But the national movement for increased agricultural productivity must be based on a careful disaggregate area-specific analysis of various physical, social and economic factors which influence the farmers' ability and incentive to raise productivity. For example, in planning for increased productivity of rice, one must not lose sight of the many obstacles on the road to a higher growth path. Unlike wheat, which is largely grown under conditions of controlled water, assured and clear weather conditions of the rabi season, rice is a kharif crop grown under conditions of uncontrolled water injection and is more susceptible to pests and diseases, besides the incidence of floods. Under these agro-climatic conditions, returns from high yielding varieties of paddy tend to be uncertain, thereby affecting the farmers' incentive to adopt the package of new technology, particularly if it involves the purchase of costly inputs such as fertilizers. Moreover, under the agro-climatic conditions of Eastern India, the returns from irrigation also tend to be much less than in states like Punjab and Haryana. These states are deficient in rainfall even for their kharif crops and have, therefore, to use irrigation to raise yields both for the kharif and the rabi crops. By contrast, in traditional rice growing areas, in a normal rainfall year, farmers do not need to use irrigation during kharif and if its use is confined only to the rabi season, the returns are often not sufficiently remunerative. Furthermore, the higher proportion of the area under small and fragmented holdings in the Eastern states also adversely affects the ability and the incentive of farmers to invest in minor irrigation works such as tubewells. There are also problems about the deficiency of rural infrastructures such as all-weather roads linking villages to the marketing centres and the unsatisfactory progress of rural electrification, which limit the rate of exploitation of the ground

> water potential. Moreover, the fact that a substantial proportion of the area under cultivation is operated under conditions of unrecognised tenancy and share cropping system also constitutes an obstacle to the adoption of new technology.[3]

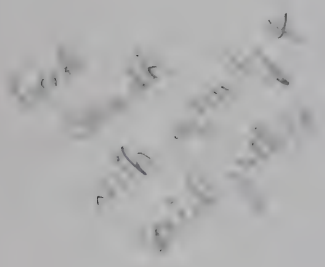
This is as much an indictment, though indirectly, of the past strategy as it is a policy design for the future.

India's post-Independence agricultural growth strategy has evolved over three distinct phases. In the first, roughly spanning the period of the First and Second Plans, agricultural growth was viewed essentially as the task of removing some of the social and economic constraints from which the cultivator had suffered for long and providing irrigation for his land. Land reforms, reconstruction of the village power structure, reorganisation of the rural poor into cooperatives, providing instructions for people's participation in planning and rural development, and socially-oriented education were the instruments to be employed by the state for agricultural and rural development. The goal was growth with equity and social justice. The emphasis was more on the latter part which was perceived to be, in itself, an instrument of growth because of its potential for releasing the productive energies of the farmer who had long suffered oppression from the state revenue authorities, the money-lender, the landlord and the trader. The effort was to be directed towards land tenurial reforms, the provision of institutional instead of the money-lender's credit, the organisation of community development projects and extension services, the establishment of panchayati raj institutions, the regulation of grain trade and the encouragement of cooperative farming. As for irrigation, the emphasis was on large, multipurpose river valley projects. Little attention was paid to the development of ground water resources independently or as an adjunct of surface water irrigation.

The second phase coincided with the period of the Third Plan. The data made available by various surveys and investigations into specific issues—like the Agricultural Labour Enquiry, the Rural Credit Survey and Farm Management Studies—challenged some of the basic assumptions underlying the strategy pursued during the first phase. The whole question of exploitation of the farmer began to look far more complex than had earlier been assumed. There was so much diversity in the socio-economic and agro-

climatic conditions (not only from state to state but even from district to district and within the same district) that centrally sponsored uniform schemes and programmes of development could not be expected to produce the desired results. This realisation led to the adoption of an area-specific approach and ensuring the supply of needed inputs to the farmer according to the particular requirements of the area concerned. The result was the adoption of the Intensive Area Agricultural Programme and the Intensive Agricultural District Programme. Studies with regard to the production function or the response of output to the use of various inputs were encouraged and emphasis came to be laid on prescription and arranging the adequate supply of the needed inputs to the farmer.

The third phase that began with the advent of dwarf wheat varieties brought technology into the centre of the agricultural development strategy. Reliance came to be placed on the use of high-yielding varieties of seeds and an increase in the consumption of chemical fertilisers for securing an increase in crop production. Since the availability of these inputs was limited, a deliberate policy decision to concentrate the use of these supplies in areas of assured irrigation was taken. This policy, which heralded the green revolution, continued till the end of the Sixth Plan. It is only now that the limitations of this approach as well as the problems it has created have begun to receive attention.



2

The Green Revolution and After

The 'new agricultural strategy' was India's response to the grave food crisis that the country faced in 1965. The crisis was long standing. Earlier, Jawaharlal Nehru had said: 'Everything else can wait but not agriculture.' However, the success of the 'grow more campaign' and the First Five Year Plan in the agricultural sector produced a feeling of smugness and complacency regarding agricultural development. Quick on the heels of agricultural success in the First Plan came the offer of supply of agricultural surpluses from the piled up stocks on highly concessional terms from the U.S. government. Taking a short-sighted view of the matter, India jumped at the offer. The die in India's development policy for the next ten years was cast. With the beginning of the Second Five Year Plan, agriculture was relegated to second place in the order of plan priorities, the development of heavy capital goods industry having become the leading concern for plan investment. The new policy was: 'Nothing else can wait but agriculture and rural development'.

Then came the trauma of 1965–66 when, as a result of widespread drought in east India, foodgrain production in the country fell from 89 million tonnes in the preceding year to 72 million tonnes that year. This happened at a time when the country was facing a severe resource constraint. The short war with China in 1962 had led to the accordance of higher priority in the allocation of resources to the needs of defence over those of development. In the face of the threat to the country's integrity that the 'China incident'

had posed, it was only natural that defence was given precedence over development. That is not the point. What is important to note in the present context is that the country was facing a paucity of funds for development purposes and that its own development process was getting stalled. Meanwhile, a feeling had been growing for some time among the donor countries that the resources available with them for international food aid were limited, relative to the demand for aid from food-deficit developing countries. The aid, they argued, should go to countries which showed the greatest chance to survive a transient shortfall in their food supply. India began to be treated as a *triage* case which could not be saved from inevitable doom. It was amidst this gathering storm on the economic and food front that Lal Bahadur Shastri, a man totally committed to the cause of India's toiling millions, became the Prime Minister of the country.

No one else in authority in the country has ever shown a greater insight into and a better perception of India's development problem than Lal Bahadur Shastri. By the single symbolic act of inviting a very senior and experienced Central Minister, C. Subramaniam, to take charge of the Food portfolio in his cabinet, he put agriculture at the centre of the stage in government policy-making and planning. It was this decision of the Prime Minister to which the credit of ushering in the green revolution in the country must ultimately go.

Subramaniam's approach to securing a breakthrough in agricultural production was twofold. First, he suggested that agriculture be given the benefit of modern farm technology that had recently become available, in a bid to raise crop yield levels in the country; and second, the farmer must be assured of a remunerative price for his produce if he were to take the risks associated with the use of expensive inputs like high-yielding varieties of seeds (which were particularly costly at the time) and chemical fertilisers. For the first, Subramaniam obtained the approval of the Cabinet for the import of 18,000 tonnes of Mexican dwarf wheat seed and spent precious foreign exchange (amounting to $5 million) on it at a time when every dollar of foreign exchange was required to import foodgrains to feed the population threatened with an impending famine of devastating proportions. At the same time, he requested the scientists in the Indian Council of Agricultural Research to rise to the occasion and intensify their effort

of adapting the latest HYV seed-fertiliser technology to Indian conditions.

Far more important and significant, however, was the policy decision he took on agricultural prices. He argued that unless the country's cheap grain policy was changed, food production could not go up. He proposed that the government should assure the farmers that there would be a government-supported base price for their produce, which would meet their costs and ensure a profit on cultivaton of land. His suggestion for this basic policy change caused a storm in the Cabinet.[4] Some senior ministers (headed by the late T.T. Krishnamachari) thought that this proposal would lead to a sharp rise in food prices all over the country and cause unrest among the politically vocal and powerful urban middle class. They called Subramaniam's proposal a disaster that would antagonise the cities. In reply, Subramaniam asked the cabinet to choose between self-sufficiency in foodgrains and urban unrest. Not only that. As he later recalled in a press interview, without the bold policy initiative he took, the choice before the country lay between starvation and 'becoming a satellite of U.S.A.' The U.S. President, Lyndon Johnson's posture at the time, he added, was such that no nation with any degree of self-respect could tolerate.[5]

The powerful support of the Prime Minister carried the day for him in the cabinet. He won the case. A 15 per cent immediate increase in foodgrain prices was granted and a one-man Commission (L.K. Jha) was appointed to examine the whole structure of prices. On the recommendation of the Jha Commission, the Agricultural Prices Commission was set up to advise the Government on a continuous basis

> on the price policy of agricultural commodities, particularly paddy, rice, wheat, jowar, bajra, maize, gram and other pulses, sugarcane, oilseeds, cotton and jute with a view to evolving a balanced and integrated price structure in the perspective of the overall needs of the economy and with due regard to the interests of the producer and the consumer.[6]

The letter of the policy decision on agricultural price policy taken at the time has been adhered to; its spirit was forgotten as soon as the results of the fertiliser-seed technology began to materialise. The bogey of consumer interest and 'stoking the fires of inflation'

has been raised even at the supposedly expert Agricultural Prices Commission level. This has been done to prevent agricultural prices from being raised adequately to induce the farmer to put in his best effort to fully realise the potential for agricultural production that modern farm technology has created.

There is sufficient empirical evidence available to prove this point as well as show the damage the agricultural price policy pursued since the early seventies has done to the growth of agricultural production. Take, for instance, the ratio between wheat and fertiliser prices. The price increases for wheat in the crisis years of 1965–67 had been given extra leverage by a price decline in nitrogen fertilizer resulting from new techniques of manufacture. This was an important factor in the success of the technological solution of the country's food problem that Subramaniam had successfully sought. In the early part of the decade, it required almost 7 kgs. of wheat to buy 1 kg. of nitrogen. Considering the risks, it was hardly an attractive proposition when one kilo of nitrogen would add only about 10 kgs. of grain to the output. By 1968, however, it required roughly 3 kgs. of wheat to buy 1 kg. of nitrogen—a very attractive proposition when the new varieties yielded up to 20 kgs. of extra grain for the 3 spent on purchase of nutrients. It should have been obvious to a perceptive policy maker that it was the engine of profit opportunity thrown up by the new farm technology, on the one hand, and the favourable turn in the grain-fertiliser prices ratio on the other, that drove the innovative dynamics of the green revolution in the country. But the point was missed. The retail control price of nitrogen (ammonium sulphate 20.6 per cent N) was Rs. 2.72 per kg. on 30 March 1972. It was raised to 2.96 per kg. on 11 October 1973 and Rs. 4.54 per kg. on 1 June 1974. In 1971–72, 2.64 kgs. of wheat were required to buy 1 kg. of nitrogen; in 1974-75 the ratio had changed to 4.14 kgs. of wheat to 1 kg. of nitrogen. The result was reflected in the growth rate of consumption of fertilisers. The all-India consumption of nitrogen showed a growth rate of 40.2 per cent in 1967–68, consumption going up from 0.74 million in 1966–67 to 1.03 million tonnes that year. The following year, the growth rate was 16.7 per cent and in 1969–70, 12.3 per cent. It rose again to a peak of 21.6 per cent in 1971–72. After that it began to decline. In 1972–73 it was 2.3 per cent, and in 1974–75 −3.5 per cent.

The country reaped a record harvest of 108.4 million tonnes of

foodgrains in 1970–71. The production in the following year was lower at 105.17 million tonnes, which further fell to 97 million tonnes the year after. It revived to 104.63 million tonnes in 1973–74 but fell to 101 million tonnes again in 1974–75. The growth rate of output of foodgrains was 9 per cent in 1970–71, −3 per cent in 1971–72, −7.7 per cent in 1972–73, 7.8 per cent in 1973–74 and −3.5 per cent again in 1974–75. Undoubtedly, the weather factor affected production from 1971–72 to 1974–75 but the relation of production with the prices and consumption of fertilisers during the period is too obvious to be missed. The procurement price of wheat (common white) in Punjab was kept constant at Rs. 76 per quintal from 1967–68 to 1972–73. For 1973–74, the Agricultural Prices Commission recommended Rs. 85 per quintal but the government (which was in the midst of a serious food crisis) fixed the price at Rs. 105 per quintal. The same price was paid in 1974–75 and 1975–76.

Production revived from 1975–76 onward when the output of foodgrains went up to 121 million tonnes. In 1977–78 production was 125.6 million tonnes and in 1978–79, 131.9 million tonnes. In 1979–80 production fell to 109 million tonnes due to adverse climatic conditions but thereafter, for three years (up to 1982–83), it remained stagnant around the level reached in 1978–79.

The technological revolution had stopped working in Indian agriculture once again. What were the reasons? Among others, the hike in the price of fertilisers decreed by the government—38 per cent on 8 June 1980, and another 17.5 per cent in July 1981. The policy was reversed and fertiliser prices were reduced by 7.5 per cent in 1983. Simultaneously, in order to clear the stock that had accumulated with the Food Corporation of India because the farmer was not lifting imported fertilisers to the extent that had been anticipated earlier, an additional 10 per cent discount was allowed on sales of 2 million tonnes from this stock. This 17.5 per cent reduction in the price of fertilisers, coupled with improvement in the procurement price of wheat and rice, broke the continuous four year (1979–80 to 1982–83) spell of production stagnation. The country had a record production of 152.4 million tonnes in 1983–84.

This makes it evident that technology alone is not enough to achieve a sustained higher growth rate in agriculture in the country. The technological thrust has to be backed by appropriate

policy measures if it is to achieve the desired results. 'The growth of agricultural production in the past,' Buta Singh, Union Minister of Agriculture at the time, lamented, 'has not been commensurate with investment in the agricultural sector'. He went on to add:

> During the period 1976–77 to 1982–83 the gross irrigated area has been increasing at the rate of 5.6 per cent per annum, diesel and electric irrigation pump sets have been increasing at the rate of 8 to 9 per cent per annum, the area under high-yielding varieties has been increasing at the rate of 7 per cent per annum and fertiliser consumption at 11 per cent per annum. While all inputs (in real terms) put together increased at the rate of 4.1 per cent per annum, the real output increased at about half that rate (2 per cent) per annum.[7]

That four out of the six years taken by the Minister in estimating the performance of agriculture were bad years does not fully explain the poor results in growth. Taking a longer time period horizon, we find the same relation between the growth rate of inputs and output. The CSO data from 1970–71 to 1983–84 shows an increase in inputs (in real terms) of 4.4 per cent per annum and an increase in real output of 2.4 per cent, showing a decline in the incremental input-output ratio by 24 per cent in the fourteen year period. 'This worsening incremental capital output ratio (ICOR) needs to be arrested and reversed during the Seventh Plan' suggested Malcolm Adiseshiah, 'through the components of growth . . . namely, conservation and improvement of soil and water use and promotion of organic manures and increased forest cover to strengthen agricultural ecology.' 'While these remedial actions are referred to in the Approach Paper,' he goes on to add, 'it is to be regretted that there is no reference to the fact that the increased outputs since the green revolution period are being obtained at the cost of even higher increases of inputs, which is a wastage of our scarce capital resources.'[8]

This is as good as saying that an exclusively technology-based growth strategy is not likely to succeed even in the future, and that we have to go deeper into the whole question of development strategy for agriculture and the policy measures needed to accelerate the past trend growth rate to the desired 4 to 5 per cent per annum level over the next ten to fifteen years. At the same time,

doubts are now being raised about the suitability of HYV-fertiliser technology for the future growth of agriculture in the country. For one thing, this technology is based on irrigation. It has neither touched so far nor is it likely to benefit in future the rain-fed and dry-land agriculture which covers 70 per cent of the land under cultivation in the country. For another, the technology is increasingly becoming too costly to remain sustainable. The unit cost of production of cereals and other produce in the green revolution areas has continued to rise partly as a result of the rise in the price of inputs and partly because of the wasteful use of water and fertiliser resources by the farmer that has developed over the years. More food is certainly being produced but at increasing cost per unit. This prevents a fall in the price of food which is necessary if the poor (who are undernourished at present) are to increase their consumption, and the present paradox of 'hunger amidst plenty' on the food front is to be resolved.

This, in itself, should be sufficient ground for changing the growth strategy and technology that has been in use in the country for the last two decades. But there are other reasons pointing to the imperativeness of the change. The most important is that actual crop production has differed so much from the plan targets that one wonders if there is any relation at all between the plan targets and the actual achievement or promise and the performance. For example, towards the close of the Sixth Plan period, the then Union Food Minister stated regretfully:

(*i*) The attainment of Sixth Plan targets in respect to pulses, sugarcane, cotton, jute and mesta is uncertain.

(*ii*) Cotton production targets have not been reached in any year of the Sixth Plan.

(*iii*) The production targets of jute and mesta were reached only in one year, i.e., 1981–82.

(*iv*) The area, production and yield of pulses was the highest in 1975–76 and these levels were not exceeded in any year in the subsequent period. In the case of gram, the highest area and production were in 1975–76 and the highest yield in 1978–79. As regards oilseeds, the highest area under groundnut was in 1971–72; for rapeseed and mustard, the peak level of productivity was attained as far back as 1974–75. In respect of cotton, the highest area was in 1979–80 and peak production and productivity in 1978–79.

(*v*) An analysis of the long-term growth rate of area, produc-

tion and yield of principal crops during the period from 1967–68 to 1981–82 reveals that jowar, bajra, small millets, barley, gram, groundnuts and sesamum had negative growth rates in area under cultivation. The output growth rates were negative in respect to bajra, small millets, barley and pulses. The growth rates of yield were negative in the case of gram and pulses. Besides, the productivity growth was low (less than 1 per cent) in the case of bajra, maize, small millets, tur, sesamum, rapeseed and mustard, total oilseeds, jute and sugarcane.

(*vi*) The growth rates assumed for the Sixth Plan are unlikely to be achieved in respect to rice, pulses, total foodgrains, sugarcane, cotton, jute and mesta.[9]

This does not encourage hope for the Seventh Plan achieving a target growth rate of 5 per cent in foodgrains and 4 per cent in agriculture as a whole. Instead of asking the basic questions (such as, why the green revolution has been halted in its course; why it has remained confined to areas where it started almost two decades ago and has not spread to other parts of the country; and why the trend growth rate of agricultural production in the post-green revolution period has practically remained the same as in the fifteen-year period preceding the revolution), policy-makers and administrators continue to have faith in the technological approach to get Indian agriculture to move faster than in the past. They do not ask themselves the question of how the past trend growth of 2.6 per cent per annum could be converted into a 4 or 5 per cent annual growth rate in the current plan period. Buta Singh suggested that the following lines of action would achieve the results that the planners have set for the Seventh Plan period:

(*i*) Where the area as well as the yield of a crop are high (e.g., wheat in Punjab, Haryana and west Uttar Pradesh), increased attention could be given to marketing and price support operation.

(*ii*) Where the yield of the crop is high but the area is not large, the strategies should be so devised as to increase the area under that crop as well as the farmers' attention and care to that crop. Examples are: summer groundnut in Orissa, Maharashtra and Gujarat; hybrid cotton in Gujarat, Maharashtra, Karnataka, Andhra Pradesh and Tamil Nadu; and *boro* paddy in West Bengal.

(*iii*) Where the area under a crop is large but the yield levels are low, efforts should be to increase the yield. This should be the strategy for rice in the eastern region and for wheat in the central region.

(*iv*) Where both yield and area are low, it is obvious that the crop itself should be replaced by another crop. Therefore, the strategy should be to bring about a change in the cropping pattern.[10]

Except for paying greater attention to 'marketing and price support operations' under the first head, the entire strategy is focused on extending the use of HYV-fertiliser technology to areas and crops which have remained so far unaffected by it. 'In every agro-climatic zone, it is the responsibility of the extension system to look for the above situations and initiate strategies,' Buta Singh told the agricultural scientists.[11]

This approach to the problem of agricultural growth is mechanical. The Minister did not stop to ask himself what had prevented the spread of modern farm technology from the northern green revolution belt to the rest of the country. Or why the farmers had not taken to the use of fertilisers and high-yielding varieties of seeds in regions 'where the yield of crop is high but the area is not big'. And why the yields per hectare, even in the best parts of the country (like Punjab) with all the available research and extension services as well as marketing infrastructure available in them, remain much below the levels reached in agriculturally advanced countries of the world. Why does the ICOR continue to rise in the country and what does the government propose to do to reverse the rising trend of the ICOR in the Seventh Plan period? Why have rice yields in the eastern region remained low so far and what makes the Minister believe that the attention of scientists is all that is required to effect a substantial increase in paddy yields and total production in the eastern region? Why has rain-fed agriculture in the country not started moving despite so much talk about dry-land farming and research effort devoted to it? It is true that the 'generation and dissemination of improved technology is very crucial to sustain the growth of agricultural production and that research and extension are the two most important factors influencing the spread of modern technology.' This, however, is a necessary but not a sufficient condition to cause a radical change in

the Indian agricultural scene needed to achieve the Seventh Plan target rates.

Bureaucracies all over the world are meant to implement given policies rather than initiate fresh thinking on policy issues. One could hardly expect, therefore, the thirty-three member Working Group consisting of officials of the Union Ministry of Agriculture (appointed to prepare a Paper outlining the programmes of agricultural development for the Seventh Plan) to come out with proposals for radical change in the policy line on agriculture that had been pursued till then. That it did not do so is not a surprise. What is surprising is that the Planning Commission thought that the work of preparing the agricultural sector portion of the Seventh Plan could be entrusted to a body of bureaucrats rather than to independent expert economists and social scientists who could help to bring fresh thinking to bear upon policy-making in the all-important field of the economy—the agricultural sector. This is a pity, because the occasion demanded fresh thinking and new policy orientations for agriculture from the beginning of the Seventh Plan.

What the country needs today is not a policy with a simplistic goal of achieving an increase in the output of a given order in selected crops but a more purposeful policy that would impart the much-needed dynamism to Indian agriculture and start a process of self-sustained growth.

The agricultural history of India during the last twenty years has been characterised by sudden jumps in production for a year or two followed by three or four years of stagnation and then another jump. This cyclical character of growth is to be replaced by a steady and sustained growth pattern. This requires setting into motion a self-sustained process which would make possible progressive modernisation of the agricultural economy over the next ten or fifteen years so that by the end of the present century we have a vibrant agriculture which is not only sufficiently strong in itself but imparts strength to the rest of the economy as well. For that, technological thrust and the introduction of management techniques in the administration of the agricultural sector by the government are not enough. These have to be backed by an appropriate package of supportive socio-economic policies. As we have seen earlier, while 'wonder' seeds provided the technological opening, it is the favourable price factor that made the start of the green revolution possible in the country. Subramaniam's successors

forgot the simple lesson that technology is important as a catalyst to trigger off a revolution in production but it alone is not sufficient to carry forward or sustain the revolution. It must be supported by appropriate policy measures that would induce the people to adopt that technology. The ignoring of this elementary maxim by the policy-makers was responsible for the fact that within five years of its start, the green revolution had lost its momentum and thrust. Since the immediate object of freeing the country from foreign food aid had been achieved, few people cared to remember the truth about what had motivated the farmers in the wheat belt of the country in the north to adopt new technology in the mid-sixties. Many of our later troubles not only with the agricultural sector but even with the economy as a whole, can be ascribed to this single fact.

Our agricultural policy has been influenced from the start by our perception of the place and role of the agricultural sector in the development process of the economy. This perception has come from the development model based on the historical experience of the developed countries of Europe. The development of these countries was marked by a steady decline in the share of agriculture in the gross domestic product and in the labour force, with a corresponding increase in the shares of other sectors, especially manufacturing industry. Development in these countries was synonymous with industrialisation. The role of agriculture in the development process in the initial stages was limited to the supply of food to sustain the labour employed in the non-agricultural sectors of the economy and to the release of surplus labour for employment in industry. The less developed countries of today, when they started on their development career after the World War II, copied this model and began looking towards rapid industrialisation as the means for raising the incomes and standard of living of their people. Agriculture was given a secondary place in their development plans.

There was an additional factor in the case of India that influenced policy-making. This was the practical stagnation in food production in British India from the later years of the last century till Independence and Partition. Partition worsened the already bad food supply situation. At the same time, it cut off the two major industries—cotton textiles and jute manufacturing—from their raw material supply bases because the larger portion of land

producing these two fibre crops now lay in Pakistan. Agricultural production in the Indian Union had to make good the loss of supplies in foodgrains, cotton and jute caused by Partition. This was the immediate challenge that agriculture in the country had to face and it was but natural that this fact should influence policy-making on agriculture in the early years of the country's Independence.

The agricultural policy that was adopted after Independence had begun to take shape earlier in the wake of the Bengal famine of 1943. The first-ever agricultural policy statement issued by the Government of India was in January 1946. The statement committed the state to giving priority to the promotion of agricultural production to increase food supply in the country. According to the statement

> The all-India policy is to promote the welfare of the people and to secure a progressive improvement of their standard of living. This includes the responsibility of providing enough food for all, sufficient in quantity and of requisite quality. For the achievement of this objective, high priority will be given to measures for increasing the food resources of the country to the fullest extent, and in particular to measures designed to increase the output per acre and to diminish dependence on vagaries of nature. Their aim will not only be to remove threat of famine but also to increase the prosperity of the cultivator, raise levels of consumption and create a healthy and vigorous population.[12]

The ten objectives of policy included: increase in the production of foodgrains and of protective foods; improvement in methods of agricultural production and marketing; stimulating the production of raw materials for industry and exports; securing remunerative prices to the producer and fair wages to the agricultural labour; ensuring the fair distribution of food produced; and promoting nutritional research and education.

The First Five Year Plan accorded a key role to agricultural development in the whole process of planned growth of the economy. The plan document stated:

> The largest portion of the natural resources of India consist of land and by far the largest proportion of inhabitants are

> engaged in the exploitation of land. In any scheme of planned economic development of the country, therefore, agricultural reorganisation and reform hold a position of basic importance .... While the several parts of the nation's economy are mutually inter-dependent and they must all receive their proper share of attention from the economic planners, the success of the whole Plan will depend on the results achieved in making the most advantageous use of the land and labour resources engaged in agriculture. In this sense the importance of agriculture is both basic and vital.[13]

The notable success of the agricultural sector in the First Plan period made the planners turn away from agriculture as the key link in the development process. The objectives of the Second Plan were: (*a*) a sizeable increase in national income so as to raise the level of living in the country; (*b*) rapid industrialisation, with particular emphasis on the development of basic and heavy industries; (*c*) a large expansion of employment opportunities; and (*d*) reduction of inequalities in income and wealth and a more even distribution of economic power. While formulating the Second Plan proposals, the planners diagnosed:

> All these objectives require a diversified economic pattern. Low or static standards of living, under-employment and unemployment and to some extent the gap between the average income and the highest incomes, are all manifestations of the basic underdevelopment which characterises an economy depending mainly on agriculture. Rapid industrialisation is thus the core of development.[14]

Further elaborating the strategy in view, the Draft Plan document went on to add:

> But if industrialisation is to be rapid enough, the country must aim at developing industries which make machines to make the machines needed for the large number of industries in the field of consumer goods and intermediate products. This is possible only if substantial expansion is undertaken in iron and steel, non-ferrous metals, coal, cement, heavy chemical and other industries of basic importance.

Obviously, agriculture had to be content with a peripheral place in the growth process. The country had made its choice of development strategy. It had decided to follow the development model based on the experience of nineteenth century Europe, which accorded the highest priority to industrialisation in the country's development plans, pushing agricultural development to the second position in those plans.

Basically, this has remained the development strategy of the successive five year plans since then. Agricultural programmes have been conceived and implemented ever since as an aid to the process of growth through industrialisation rather than as an integral (leave alone the central) part of the growth process. The function assigned to the agricultural sector is to serve as a supplier of foodgrain and raw material for industry in the required quantities. Production targets in every five year plan are set according to the projected needs of the economy for foodgrains and commercial crops and production programmes are designed to meet those targets. Plan allocations are made accordingly.

Objections to this growth strategy were raised at the very outset by economists like C.N. Vakil and B.R. Shenoy. In the discussions of the Panel of Economists on the Plan Frame of the Second Five Year Plan, the critics argued that the relative neglect of the wage goods sector (which meant agriculture and small scale consumer goods industries) would result in growing shortages of food and other articles of daily consumption and, thus, prove inflationary in its impact. It did not take long for these apprehensions to come true. Food shortages (which had been overcome completely and the country made self-sufficient in grain supply during the last two years of the First Plan) reappeared in the very first year of the Second Plan as did the inflationary pressures in the economy. Both gathered momentum so that by the end of the 1950s and early sixties, the country was once again confronted with a serious food, and a little later, an inflationary crisis. The problem was sought to be solved not so much by vigorous action towards raising domestic food production as by increasing resort to concessional imports of foodgrains and some cotton from USA under PL 480 agreements with that country. In the Second Plan period, 19.3 million tonnes of foodgrains, mostly wheat, were imported.

The process continued during the Third Plan period. Half-hearted efforts were made to increase domestic production.

Intensive District followed by Intensive Area Agricultural Development Programmes were launched. But the dependence on imports not only continued but actually increased during the Third Plan period. In 1964–65 the country had a record production of 89 million tonnes of foodgrain. Yet, the wholesale price index rose that year by 11 per cent and imports of foodgrain went up from 3.6 million tonnes in 1962 and 4.56 million tonnes in 1963 to 6.3 million tonnes in 1964 and 7.16 million tonnes in 1965. It is at this stage that India came to be regarded by the aid-giving countries as a *triage* case or one for which there was little hope of survival with the limited amount of aid that was internationally available and which, therefore, deserved to be dumped so that food aid coming to it could be used for better purposes to save the more deserving food-deficit nations. They found confirmation of their view in the crisis of 1965–67 caused by the widespread failure of crops in the eastern states of Bihar and Orissa, necessitating still heavier imports to stave off famine and save life. President Johnson's action to keep this country thenceforth on a leash in the release of PL 480 supplies to it—he decreed future agreements under that head to be of a few months duration each—added to the future uncertainties over food supply and the grimness of the situation. It was this challenge that paved the way for the adoption of the new agricultural strategy and the resulting green revolution in 1967.

The revolution shifted the supply curve of foodgrains once-over by 20 million tonnes, the output going up from the pre-revolution record of 89 million tonnes in 1964–65 to a peak of 108.42 million tonnes in 1970–71. Then there was a pause in growth for four years caused by, apart from unfavourable weather conditions, an unimaginative price policy pursued by the government with respect to foodgrains and fertilisers. Adjustments made in that policy brought about another spurt in production starting the second phase of green revolution. This spurt (beginning in 1975–76 when grain production suddenly jumped from 101 million tonnes in 1974–75 to 120.8 million tonnes that year) continued for the next three years culminating in another peak of 131.8 million tonnes of grain production in 1978–79. The same factors that had caused the stagnation of production and the stalling of the green revolution once again came into operation. The production curve had been shifted up by another 23 million tonnes in the second phase of the revolution and it stayed there for the next four years. Once again

an increase in the procurement prices had to be made over the four-year period and a 17.5 per cent reduction (7.5 per cent reduction plus 10 per cent discount on the sale of old stock) in fertiliser prices made in 1983–84 before another spurt of 20 million tonnes in grain production was achieved in 1983–84. The production of 152.4 million tonnes in 1983–84 meant the shifting of the production curve by another 20 million tonnes. Since then, production has remained stagnant at around the 150 million tonnes mark. In keeping with past experience, the next jump of about 20 million tonnes may come in 1987–88 or 1988–89 depending upon when the government gives the next concession in fertiliser prices and, of course, upon the amount of rainfall in that year. The reason for this stop-go-stop record in agricultural growth during the last twenty years is that the technological breakthrough obtained in the mid-sixties has not been backed by consistent and appropriate supportive farm policies by the government.

The absence of appropriate and adequate policy support has stood in the way of the realisation of the full potential of agricultural growth through the application of modern farm technology by the country. Even today, the approach to agricultural growth in the country remains target-oriented and the reliance for achieving the set targets is entirely on technological factors (like extension of irrigation, covering greater area under HYV seeds, increasing the consumption of chemical fertilisers and pesticides, and expansion of research and extension services at the laboratory and field levels). It is not being realised even now that technology and the availability of modern inputs can only make increased farm production possible. The actual realisation of the potential thrown up by the new technology depends, among other things, upon the motivation of the farmers to put their land to the best use, and to make optimal use of modern technology and the inputs associated with it for raising crop yields. Indian policy-makers have completely ignored this in their formulation of agricultural policy. This explains why even after the beginning of the green revolution in 1967, the growth rate of agricultural output in the country has been practically the same as during the pre-revolution period. Higher growth rates (such as those envisaged in the fifteen-year perspective outlined in the Sixth Plan and again in the Seventh Plan) are possible only if the technological thrust is backed by a package of appropriate policy measures focusing on the motiva-

tion of the farmer to put his land to the best use, take the fullest advantage of technological know-how and inputs made available to him, practise efficient land- and water-management on his farm, adopt the cropping pattern that gives him the maximum possible returns in money terms besides providing him and his family members maximum amount of on-farm employment, and effect innovations on his own to get the best out of his farming business. In our policy-making, the importance of the involvement of the human factor in the development process has been completely ignored. This deficiency has to be made good, for, experience all over the world is that in agricultural development, man counts more than any other agent of production.

3

Current Problems and Challenges

Agricultural growth in India over the past thirty-five years has been characterised by certain features which need close attention. Among the more important of these are:

1. The overall annual compound growth rate of 2.6 per cent for the thirty-four-year period from 1949–50 to 1983–84, though satisfactory, is much below the 4 to 5 per cent mark that is deemed technically feasible and economically very essential.
2. The growth rate of foodgrain production was the same as that of all crops, namely, 2.6 per cent but that of cereals was significantly higher, being 2.96 per cent.
3. Among cereals, wheat has recorded the highest growth rate of 6.22 per cent while small millet and barley recorded negative growth rates of 0.90 and 0.80 per cent respectively.
4. Wheat also recorded the highest productivity gains among all crops, the growth rate of yield of the crop being 3.12 per cent over the period.
5. As in the case of different crops, growth was not evenly distributed over different states of the Union. In fact, a larger part of the growth in foodgrain production is accounted for by the contiguous tract in the north comprising Punjab, Haryana and west U.P. Andhra Pradesh, Maharashtra and Jammu and Kashmir are other states that have shown above the national average growth rates in the seventies.

Compared to this, four states (namely, Tamil Nadu, Kerala, Madhya Pradesh and Himachal Pradesh) occupying almost one-fifth (19 per cent) of the foodgrain areas, have experienced negative growth rates in the 1971–81 decade. Eight other states (Rajasthan, Orissa, West Bengal, Bihar, Assam, Uttar Pradesh, Gujarat and Karnataka), comprising over 55 per cent of the area, experienced a growth rate below the national average.

6. There is a direct positive correlation between the growth rate in agricultural production in a region, on the one hand, and the expansion of irrigation together with the increase in the consumption of chemical fertilisers, on the other. The states with a high percentage of cultivated area under irrigation show high output growth rates, high intensity of cropping and high consumption of chemical fertilisers per hectare of cultivated area.
7. States with high agricultural growth rates show a much lower incidence of poverty and much higher per capita income levels than those with modest or little growth in the agricultural sector.

These features may be discussed under three broad heads: (*i*) sluggish and uneven growth of crop production and the distortion of cropping patterns; (*ii*) inter-state and regional disparities in growth; and (*iii*) agricultural growth and poverty. Let us discuss each of these in turn.

Crop Production

Table 3.1 shows at a glance the compound annual growth rates of area, production and yield of different crops separately for the longer period of thirty-four years (from 1949–50 to 1983–84) and the latter half of that period, which is the period of the green revolution.

The principal achievement of Indian agriculture which is acclaimed internationally is that the growth rate of foodgrain production in the country has exceeded the demographic growth rate. The result is that as against a state of perennial food shortage in the first two decades since Independence, we can today boast of

Table 3.1

Compound Growth Rates of Area, Production & Yield of Principal Crops in India (in per cent per annum)

Crop	*During 1967–68 to 1983–84*			*During 1949–50 to 1983–84*		
	Area	*Production*	*Yield*	*Area*	*Production*	*Yield*
Rice	0.92	2.46	1.53	0.64	2.27	1.62
Wheat	2.80	6.02	3.12	2.68	5.77	3.00
Jowar	−0.16	1.37	1.53	−0.76	2.04	2.82
Bajra	0.34	2.13	1.79	−0.79	0.70	1.51
Maize	1.86	2.63	0.75	−0.05	0.66	0.70
Ragi	0.27	1.84	1.57	0.61	2.79	2.18
Small millet	−0.77	−0.90	−0.13	−1.79	−1.23	0.57
Barley	−2.04	0.80	1.27	−4.50	−3.01	1.54
Coarse cereals	0.45	1.47	1.28	−0.89	0.91	1.75
Total Cereals	0.84	2.96	1.77	0.37	2.87	2.04
Gram	−0.55	Neg.	0.55	−0.35	−0.51	−0.19
Tur	0.60	0.26	−0.35	0.99	1.38	0.39
Other pulses	0.80	0.47	−0.33	0.85	0.79	−0.06
Total Pulses	0.33	0.23	0.08	0.47	0.35	−0.02
Total Foodgrains	0.74	2.61	1.56	0.38	2.61	1.84
Sugarcane	2.04	3.11	1.12	2.02	3.05	1.01
Groundnut	1.42	1.98	0.55	0.02	1.23	1.20
Sesame	0.05	0.46	0.41	−0.33	1.22	1.57
Rapeseed & Mustard	1.80	3.13	1.30	1.42	2.53	1.09
*Seven Oilseeds**	1.13	2.07	0.73	0.38	1.72	1.35
Total Oilseeds†	1.06	2.00	0.62	0.32	1.53	1.13
Cotton	0.50	2.42	1.90	0.17	2.17	2.00
Jute & Mesta	0.95	1.30	0.57	0.70	2.00	1.13
Total Fibres	0.50	2.12	1.55	0.19	2.04	1.77
Tea	0.82	2.48	1.65	0.79	2.81	2.01
Coffee	2.86	4.88	1.96	3.87	4.65	0.75
Rubber	6.37	8.66	2.12	3.40	5.75	2.25
Total Plantation Crops	2.34	3.12	1.72	2.21	3.33	1.85
Potato	3.99	5.97	1.90	3.92	7.42	3.37
Tobacco	0.80	2.28	1.48	0.27	2.67	2.40
Total Non-foodgrains	1.22	2.62	1.04	0.81	2.53	1.33
All Crops	0.84	2.61	1.42	0.50	2.59	1.68

Note: * Seven oilseeds include groundnut, sesame, rapeseed and mustard, linseed, castorseed, nigerseed and safflower.

† Total oilseeds include seven oilseeds, coconut and cotton seed.

being 'virtually alone among the developing nations in establishing significant reserve holdings'[15] accumulated over the years from our own crop surpluses. This is a sea-change from the situation in the early sixties when India had come to be regarded by foreign experts and aid donors as a doomed nation with respect to food supply and food security.

This is, indeed, an impressive achievement but unfortunately this is all that the Indian planning and development effort over the last thirty-five years has to show to its credit in the agricultural field. Even here, the picture is not as bright as it appears at first sight. First, wheat accounts for the major gains in productivity and production among the cereals registering the highest growth rates of production, area and yield in the period 1949–50 to 1983–84. It is interesting to note that the growth rate of output of wheat in the post-green revolution period is lower than for the pre- and post-revolution periods combined. This is partly the result of the slowing down of the growth rate of cultivated area under wheat after the introduction of HYV-fertiliser technology in the mid-sixties. The larger part of the increase in output after 1966–67 was achieved through an increase in yields while in the preceding seventeen years, the greater part of the increase in production came from the expansion of the area under cultivation of the crop. From 660 kgs. in 1950–51, the yield per hectare of wheat rose to 708 kgs. in 1955–56 and 851 kgs. in 1960–61 but fell to 821 kgs. in 1965–66 (which was a year of severe drought).

After the beginning of the green revolution, the yield of this crop rose steadily from the previous record of 861 kgs. in 1960–61 to 1,307 kgs. in 1970–71, to 1,691 kgs. in 1981–82 and 1,851 kgs. in 1983–84 This means more than a doubling of the average yield over the thirteen-year period. Partly, also, the lower growth rate in production shown for the period 1967–68 to 1983–84 is statistical. The year 1967–68 was the first year of the green revolution and a bumper crop year. The growth rate of production calculated on the high base of output in that year for the period ending 1983–84 (again an exceptionally good crop year) is bound to be a little lower than if the base taken were low.

The green revolution has been called the wheat revolution by many. Considering the fact that the share of wheat in the total cereal production of the country rose from 15.23 per cent in 1950–51 and 16.66 per cent in 1965–66 to 29.66 per cent in 1978–79

and 32.5 per cent in 1983–84, the description does not appear to be inapt. The growth in rice production has been relatively modest, its output going up from 20.6 million tonnes in 1950—51 to 30.56 million tonnes in 1965–66, 53.8 million tonnes in 1978–79 and 59.8 million tonnes in 1983–84. The share of rice in total cereal production went down from 48.6 per cent in 1950–51 and 49.1 per cent in 1965–66 to 44.6 per cent in 1978–79 and 43.1 per cent in 1983–84. The total foodgrain production in the country rose from 50.8 million tonnes in 1950–51 to 152.4 in 1983–84 (or an increase of about 101 million tonnes). Of this increase, the share of wheat and rice together was 78 million tonnes or more than three-fourths of the increase.

Before the green revolution, maize, bajra and ragi, among the coarse grains, showed satisfactory growth rates in output. However, after the revolution they lost ground, both in cultivated area and output, to wheat and paddy. The result was that except for ragi, the other two crops showed extremely poor growth rates of production for the period 1967–68 to 1983–84. Taking all the coarse cereals together, their output increased from 15.4 million tonnes in 1950–51 to 21.4 million tonnes in 1965–66, 30.4 million tonnes in 1978–79 and 34 million tonnes in 1983–84. Small millet, as can be seen in Table 3.1, for the whole period under review, has shown a negative growth rate in area, yield and output. This is a disconcerting development because these formed the staple of the diet of the poor in large parts of rural India. These were grown by subsistence farmers. While this may suggest that some of these farmers have taken to more remunerative crops, which is to be welcomed, the large majority among them are losers because without any new avenue of income and employment opening to them, they have been made to change their staple diet from coarse grains to wheat and rice which they have to buy from the market.

A part of the explanation for this change lies in the fact that the prices of 'superior' grain, wheat and rice, are lower than the cost of production of coarse grains. But this would be an advantage if a farmer were putting his tiny piece of land to more productive use than cultivation of low-yielding millet and other coarse grains crops. This, however, is hardly the case. This apart, the very fact that the subsistence farmer, as a result of this process, has now been drawn into the vortex of market and money economy and exposed to competition instead of being governed by tradition and

custom which was the case earlier, is at a disadvantage in as much as the transition is from the status of an independent, though poor, farmer to that of a market-dependent consumer with little means to exercise any pull on the market.

Even more depressing in the growth of grain output in the country is the fact that the production of pulses (which are the main source of protein for the poor eating a vegetarian diet) has remained practically stagnant over the last three decades. The total production of pulses in 1960–61 was 12.7 million tonnes. It was 10 million tonnes in 1973–74, 12.2 million tonnes in 1978–79, 12.71 million tonnes in 1983–84 and 12.2 million tonnes in 1984–85. The per capita availability of pulses consequently fell from 69 grams per day in 1960–61 to 45.2 grams in 1977–78, 44.9 grams in 1978–79 and 39.2 grams in 1982–83. It was 38.9 grams in 1984–85.

Apart from its adverse socio-economic effects, this unbalanced growth of food crop production reflects badly on our system of planning and the nature of our planned economy. There seems to be little relation between planning in the agricultural sector and actual crop production, between the targets fixed for individual crops and actual achievement. It is true that in a free market economy (such as we have in agriculture where production decisions are to be taken by millions of farmers spread over the vast continent with diverse agro-climatic and socio-economic conditions), the cropping pattern cannot be dictated by any central authority like the Planning Commission. But there are factors like price and fiscal policies that can be deployed effectively to influence and even regulate the cropping pattern along the desired lines. This element has been conspicuous by its absence in our planning which, by and large, has meant the allotment of plan outlays to various sectors of the economy in a five-year period framework. Distortions and imbalances that crop production has suffered over the last thirty-five years serve to emphasise the point that the failure of Indian planning in the agricultural field, at least, is due to the fact that plan outlays for development were not backed by the necessary supportive policies to achieve the desired production results and cropping pattern; the increase in the production of pulses and oilseeds is a case in point. This was made part of the highly publicised 20-Point Programme. Yet the 13 million mark reached in 1975–76 in pulses output remains the record which has not yet been matched.

The case of oilseeds is only slightly better: the output of the seven oilseeds (which stood at 8.61 million tonnes in 1976–77) rose to a peak of 12.8 million tonnes in 1983–84, compared to 10 million tonnes in the previous year. In 1984–85, the output touched the 13 million tonnes mark but declined the next year to 11.15 million tonnes. This shows that the increase in 1983–84 did not represent a break from the past but was the effect of favourable rainfall during that year.

Regional and Inter-State Disparities

If distortions and imbalances in the cropping pattern were the result of the absence of the necessary policy support to agricultural planning, regional and inter-state disparities in agricultural growth were the outcome, albeit indirectly, of the agricultural policies after the mid-sixties when the principal national concern in farm production became attaining self-sufficiency in food supply. The new agricultural strategy of concentrating the use of available supplies of inputs (like HYV seeds, chemical fertilisers and pesticides) in areas which held out the best promise of quickest returns in terms of output, laid the foundations for accentuating the already existing regional and inter-state disparities due to natural and socio-economic factors. The northern region, which had the inbuilt advantage of having large supplies of irrigation water, forged ahead of the other regions in the growth of agriculture and foodgrain production. Once set into motion, the process of widening of inter-regional and inter-state disparities in growth rates continued gathering momentum. The process was sustained by the policies that the compulsions of the national food self-sufficiency objective forced the government to pursue. Table 3.2, showing the annual compound growth rates of area, yield and production of food grains over the period 1960–61 to 1980–81, illustrates the point.

In the case of production, only the northern region (with an annual growth rate of 5.36 per cent) was above the national average of 2.31 per cent. The southern region was the lowest followed by the eastern region. The growth rates of area and yields (at 1.16 and 4.15 per cent, respectively) in the northern region were also the highest among all the regions. However, the gains in yield, as is to be expected under the circumstances, were far greater than the gains in area under cultivation in the region.

Table 3.2
Growth Rates of Area, Production and Yield of Foodgrains in Different Regions (1960–61 to 1980–81)

Region	*Annual Compound Rate of Growth 1960–61 to1980–81*		
	Area	*Production*	*Yield*
Central	0.58	2.14	1.55
Eastern	0.84	1.86	1.03
Northern	1.16	5.36	4.15
Southern	−0.62	1.70	2.32
Western	0.27	2.01	1.73
All-India	0.46	2.31	1.83

Table 3.3
State-Wise Growth of Foodgrain Production (in million tonnes)

State	*Average 1978–81*	*Average 1970–73*	*Average 1962–65*	*Growth Rates*		
				1970–73 to 1978–81	*1962–65 to 1970–73*	*1962–65 to 1978–81*
Andhra Pradesh	10.1	6.2	6.7	6.19	−0.98	2.54
Assam	2.3	2.3	1.9	0.50	2.23	1.37
Bihar	9.1	7.1	6.3	3.14	1.52	2.33
Gujarat	4.3	3.4	2.4	2.92	4.50	3.71
Haryana	5.9	4.4	2.4	3.67	7.88	5.75
Himachal Pradesh	0.9	0.9	0.69	0.54	3.36	1.94
Jammu & Kashmir	1.2	0.9	0.56	3.58	5.80	4.69
Karnataka	7.1	5.2	4.3	3.87	2.45	3.16
Kerala	1.3	1.33	1.12	−0.03	2.15	0.91
Madhya Pradesh	10.5	9.7	8.5	1.03	1.63	1.33
Maharashtra	10.0	4.2	6.2	11.58	−4.89	3.01
Orissa	5.2	4.0	4.2	3.08	−0.61	1.22
Punjab	11.9	7.6	3.4	5.72	10.42	8.05
Rajasthan	6.5	6.4	4.4	0.26	4.72	2.47
Tamil Nadu	6.9	6.5	5.2	0.83	2.87	1.85
Uttar Pradesh	21.3	17.2	12.3	2.70	4.30	3.50
West Bengal	7.8	7.2	5.7	1.08	3.62	2.01
Total All-India	123.8	94.6	76.2	3.42	2.74	3.08

A better idea of the unevenness of growth of foodgrain production geographically can be had by looking at the growth rate figures of the states. Table 3.3 shows the state-wise growth of foodgrain production for seventeen major states.

Six out of the seventeen states showed a growth rate higher than the national annual average of 3.08 per cent during the period 1962–65 to 1978–81. Punjab, with an annual growth rate of 8.05, stood at the top and Haryana with a rate of 5.75 came second. In U.P., the growth rate at 3.5 per cent per annum during the period was not so spectacular compared to the other two northern states but that is due to the fact that only the western districts of U.P., which are well irrigated, have experienced the impact of the green revolution.

Taking an average of four years, 1979–80 to 1983–84, we find that the three northern states of Punjab, Haryana and U.P. (with 16.8 per cent of the population of the country) account for 33.38 per cent of the grain production. If we take Punjab and Haryana alone, the picture becomes more stark. With 4.3 per cent of India's total population, these two states contributed 14.3 per cent of the country's total grain production in 1983–84. Against that, four western and central region states—Gujarat, Rajasthan, Maharashtra and Madhya Pradesh—having 26 per cent of the country's population produced 26.4 per cent of its grain output; the four southern states—Andhra Pradesh, Tamil Nadu, Karnataka and Kerala—accounted for 19.23 per cent of the foodgrain production against 25 per cent of the population; and the four eastern states—Assam, Orissa, West Bengal, and Bihar—had 18.12 per cent and 25.4 per cent, respectively, as their share in foodgrain production and the population of the country. Thus, compared to the proportion of the population they have, the three northern states of Punjab, Haryana and U.P. constitute the only food surplus region out of the four regions. The eastern and southern regions have turned heavy deficit regions. Of the procurement of 18.2 million tonnes of foodgrains in 1984–85, the three northern states accounted for 15.2 million tonnes (or 83 per cent) of the total. The only state outside the region contributing significantly to the procurement of grain by the Centre was Andhra Pradesh which contributed, in 1984–85, 1.1 million tonnes (or a little over 6 per cent of the total of 18.2 million tonnes). This means that for running the public distribution system, the Union government has to depend

for 90 per cent of the needed supplies on four states—Punjab, Haryana, Uttar Pradesh and Andhra Pradesh—which have surplus production to spare.

The three northern states are the principal states with irrigated agriculture. They have the highest proportion of cultivated area under irrigation and the highest intensity of cropping in the country. Thus, against the national average of 26.6 per cent, 78.09 per cent of its sown area was irrigated in Punjab in 1978–79 while the intensity of cropping here was 159 (against the national average of 123). Tables 3.4 and 3.5 give the relevant data for the other states.[16]

Punjab and Haryana are far ahead of the other states, both in the proportion of irrigated to total cultivated area and in the intensity of cropping. These two states, together with the western part of Uttar Pradesh, are the centre of the agricultural growth that India has experienced in the last twenty years. The two states, which were united at one time, started with some initial advantages for rapid agricultural growth: a highly developed irrigation system; a hardy peasantry which is responsive to new ideas; a network of roads and transport connecting not only the towns to each other but the villages to the towns as well; organised *mandies* for the sale of the produce; and two agricultural universities at Ludhiana and Hissar which not only conduct agricultural research but also actively engage themselves in extension work. The two states were also fortunate to have ruling politicians strongly committed to agricultural growth. These advantages would have given them an excellent start in agricultural growth; and they certainly did.

But, even so, the growth could not have been sustained or could not have continued gathering momentum if it had not been helped by the Central government policies which, wittingly or unwittingly, were discriminatory in favour of agriculture in these two states. The whole agricultural policy of the country came to centre on getting the maximum procurement of foodgrains from these two states to feed the public distribution system so that it could be run without resorting to imports or with a minimum of imports. The liberal allocation of funds for the construction of irrigation works; generous concessions offered for private irrigation works; supply of inputs (like fertilisers, seeds, pesticides, irrigation water, electricity and others) on a priority basis and at highly subsidised rates; and setting of procurement prices with a

Table 3.4
Irrigated Area State-wise 1978–79 (Area in '000 hectares)

State	*Net Sown Area*	*Irrigated Area*	*Percentage*
Punjab	4,177	3,262	78.09
Haryana	3,650	1,918	52.55
West Bengal	5,539	1,489	26.88
Uttar Pradesh	17,482	8,892	50.86
Orissa	6,097	1,148	18.83
Bihar	8,532	2,960	34.69
Kerala	2,204	228	10.34
Assam	2,679	572	21.35
Tamil Nadu	6,251	2,873	45.96
Andhra Pradesh	11,349	3,655	32.21
Madhya Pradesh	18,847	2,315	12.28
Rajasthan	15,471	2,895	18.71
Gujarat	9,543	1,715	17.97
Maharashtra	18,245	1,896	10.39
Karnataka	10,315	1,409	13.66
All-India	1,42,938	37,961	26.56

view to inducing the farmer in Punjab and Haryana to produce and supply the maximum wheat and rice to the public sector procurement agencies—all these factors had the effect of perpetuating the advantage the two states had at the start over the rest of the country in producing wheat, and later rice as well. A dualistic economy came to be built up in agriculture also, with the progressive, capital-intensive, modern and innovative segment located in these two states plus the contiguous districts of western Uttar Pradesh, and the stagnant, traditional, and relatively unproductive segment over the rest of the country. There was little 'trickle-down' effect of the green revolution from the northern green revolution belt to agriculture in the rest of the country. The result is the present contradictory situation of glut in foodgrains, wheat and rice, with the incidental problems of finding safe storage and the heavy cost of carrying the surplus stocks, on the one hand, and almost 40 per cent of the country's population remaining undernourished and semi-starved on account of lack of purchasing power, on the other. It is the agricultural policies of the government, pursued particularly since the mid-sixties, that are largely to be blamed for this contradictory food situation in the country.

Table 3.5
Intensity of Cropping, 1978–79 ('000 hectares)

State	Net Sown Area	Land Use		Intensity of Cropping (Col. 4 over 2 × 100)
		Double Cropped Area	Gross Cropped Area	
1	2	3	4	
Punjab	4,177	2,453	6,623	159
Haryana	3,650	1,872	5,522	151
West Bengal	5,539	2,339	7,878	142
Uttar Pradesh	17,482	6,818	24,300	139
Orissa	6,097	2,178	8,275	136
Bihar	8,532	2,849	11,381	133
Kerala	2,204	682	2,886	131
Assam	2,679	632	3,311	124
Tamil Nadu	6,251	1,433	7,684	123
Andhra Pradesh	11,349	1,772	13,121	116
Madhya Pradesh	18,847	2,900	21,747	115
Rajasthan	15,471	2,025	17,496	113
Gujarat	9,543	846	10,389	109
Maharashtra	18,245	1,615	19,860	109
Karnataka	10,315	818	11,133	108
All-India	1,42,938	32,239	1,75,177	123

Oilseed production is another weak spot in the overall growth of agriculture in the country. As pointed out earlier, the production of oilseeds* in the country has not kept pace with the growth in demand for edible oils. In per capita terms, the output of oilseeds (which was 15.76 kgs. per annum in 1961) rose to 17.46 kgs. per annum in 1971 but fell to 13.58 kgs. per annum in 1981. It had improved to 17.25 kgs. per annum in 1984 which, though higher than that in 1981, was still lower than the 1971 level. Meanwhile, the consumption of edible oils has increased because they are now substituting butter and ghee as a cooking medium on a wide scale in the country. Hence the increasing shortage of oilseeds and the rapidly growing import bill of the country for edible oils. This bill, which stood at a mere Rs. 23 crore in 1970–71 and still lower (at Rs. 14.2 crore) in 1975–76, rose sharply to Rs. 446.3 crore in

* The principal oilseed crops are groundnut, rapeseed and mustard, sesame, linseed, and castorseed.

1979–80 and Rs. 683 crore in 1980–81. The provisional trade figures for 1984–85 put the imports of edible oil for that year at Rs. 921 crore and for 1985–86 at Rs. 614 crore. The final figure for the latter year is, however, likely to turn out to be much higher.

The sharp increase in the import of edible oils in India coincided with the beginning of a difficult phase of balance of trade and external payments balance situation in the country. It is the strain on foreign exchange resources of the country that the growing import of edible oils caused which was responsible for focusing attention on the need for encouraging oilseeds production in the country.

Increasing the production of oilseeds in the country poses some peculiar problems. Price incentives and input subsidies cannot, by themselves, bring about crop substitution in the desired direction of increased production of oilseeds in place of cereals (which have begun to be in surplus supply). The surplus cereal production is confined to irrigated regions while oilseed crops are raised mostly in dry-land and rain-fed agriculture regions. Because little attention has been paid by research scientists in the past to evolving high-yielding strains of oilseed crops, excepting groundnut to some extent, the yields in these crops continue to be low. The average per hectare yield of nine oilseed crops in the country was 579 kgs. in 1978–79, 532 kgs. in 1980–81 and 563 kgs. in 1982–83. It is only in the following two years that some improvement in the matter became visible, with the average yield rising to 679 kgs. in 1983–84 and 684 kgs. in 1984–85. There was a set-back in 1985–86, again, with the average yield falling to 591 kgs. Even this yield level is not attractive enough to tempt the farmer to grow oilseeds in place of cereals where such a substitution is technically possible because the yields in the two principal cereals are, on an average, three times the improved average yield levels of oilseed crops, apart from the fact that the cultivation risks in the case of the latter crops are far greater than those in the case of the former.

It is against this background that measures like the inclusion of the promotion of oilseed production in the 20-Point Programme, and the free distribution of mini-kits of seeds and fertilisers among the small and marginal farmers for the cultivation of oilseed crops are to be viewed. These measures, however, failed to produce the desired results.

This led the government to adopt a crash programme to boost

oilseed crop production in the country. The programme took the form of establishing a Technology Mission on oilseed production. The Mission came into existence on 30 April 1986. It has been mandated to make the country self-reliant in vegetable oils as early as possible. The Mission has set itself the task of raising oilseed production to 18 million tonnes by 1990 and 26 million tonnes by the year 2000. It operates as the task force of all the concerned agencies connected with the growth of oilseed production (namely, oilseed crop research, extension, input supply, price support, marketing and processing). A Standing Committe has been set up to monitor the Mission's progress from month to month. Measures taken by the Mission in the first year of its existence are reported to have resulted in 'an increase of 7 per cent in production and 10 per cent in productivity during Kharif 1986 over Kharif 1985 in spite of the fact that area has come down by 3 per cent due to drought'.

Some encouraging results have been achieved on the technological front. According to a Report by the Agricultural Ministry on the key role of technology in 'India's March Towards Accelerated Agricultural Production' (1987) as a result of improved technologies developed, 'under the real farm situation, yields from groundnut, sesame, and castor could be stepped up by 73 per cent, 247 per cent and 32 per cent over and above that realised from traditional farmers' practices through adoption of recommended improved technologies'.[17] This is the potential, the existence of which is already known. How much of it is actually realised is anybody's guess. The results of the first year of the working of the Mission cannot be said to be very promising.

Sugarcane

The case of sugarcane falls in a different category. Sugarcane is an irrigated crop and one should expect, therefore, a steady yearly growth of output for this crop, balancing the growth of demand for sugar. But contrary to expectation, the production of sugarcane in the country has developed a cyclical character. In 1976–77 the output was 153 million tonnes. It rose sharply to 175.97 million tonnes in 1977–78 but fell to 151.66 million tonnes in 1978–79 and 128.53 million tonnes in 1979–80. It went up again to 154.25 million tonnes in 1980–81 and shot up to 186.36 million tonnes in

1981–82 and 189.5 million tonnes in 1982–83. In 1983–84 it fell to 174 million tonnes and in 1985–86 to 172 million tonnes. One cannot explain these wide fluctuations in sugarcane production except in terms of the irrational and uncoordinated price policy followed by the Centre and the major sugarcane-producing states with respect to this crop.

These regional and inter-crop imbalances underscore the point that agricultural policy has so far been concerned entirely with the overall growth of agricultural output, to the neglect of achieving a balanced growth in this vital sector of the economy and obtaining a planned cropping pattern. It is only now that this basic weakness in the agricultural growth strategy has begun to receive official recognition and attention. Commenting on agricultural production during the year, the *Economic Survey* for 1984–85 stated:

> The strategy followed so far has been amply rewarded. However, imbalances persist, region-wise and crop-wise. It is, therefore, necessary to have a region-specific strategy. Some areas show very substantial increase in yield rates while others have lagged behind. Efforts for raising yields in the latter regions command priority. Apart from increasing overall production, this would also help to reduce regional imbalances. Similarly, yield rates of small and marginal farmers continue to lag behind. Since the bulk of the total cultivated area is operated by small/marginal farmers, improvement in the productivity of the small holdings is crucial for further increases in overall production.[18]

The 1985–86 *Economic Survey* went further and analysed the causes behind the emergence of imbalances in the cropping pattern. It stated:

> A number of factors influence the changing cropping pattern, including differential rates of technological change among crops, the spread of irrigation leading to area shrinkage of dry crops, market intervention and support by the government in certain crops but not in other crops and *perhaps most significant of all, the changing relative prices between different crops* (emphasis added).[19]

After referring to the phenomenon of 'shortfall in the production of edible oilseeds and sugarcane necessitating substantial imports of edible oils and sugar, while at the same time stocks of wheat, rice and jute rise above the desired levels,' the *Survey* went on to underline the obvious point that 'clearly it is not feasible to continue sizeable imports of edible oils over a long period' and that 'efforts need to be made to encourage domestic production of oilseeds.'

The policy formulation in this regard must not be on the basis of a single crop. The problem of inter-regional and inter-crop disparities in the cropping pattern is complex and has emerged over a long period. It has its origin in the traditional cropping pattern evolved in the past by each state in response to its own consumption and raw material needs. Internal trade in agricultural produce between different parts of the country has remained rather limited, with the result that the regional specialisation of crops that would accord with the principle of maximum comparative advantage did not materialise. A large part of agriculture remained of the subsistence variety and non-commercial in nature. Even after Independence, this pattern continued (except in those states which had the advantage of ample irrigation facilities). As mentioned earlier, the compulsions of acquiring national self-sufficiency in foodgrains at the earliest led to the adoption of the New Agriculture Strategy which brought about the green revolution. This, together with the concentration of the major part of the increase in production in a limited area in the north-west of the country, had the unanticipated (though perfectly logical) effect of much greater commercialisation of foodgrain production than ever before. Of course, the food policy (which included the fixation of procurement prices, the conduct of procurement operation in the public sector and the organisation of a country-wide public distribution system on the basis of a uniform price for the consumer) partly contributed to this result. But, principally, two crops—wheat and rice—were affected by this development. In the case of other crops (including coarse grains, pulses and the commercial crops like jute, cotton, sugarcane and oilseeds), the old stratification of production on a regional basis continued. It is this change in a small, albeit extremely important, segment of the agricultural economy amidst its otherwise unchanging character that was responsible for the accentuation of regional and inter-crop imbalances that have come in for a good deal of comment in the last few years.

A study undertaken by the National Council of Applied Economic Research, New Delhi, indicates that at least with respect to yields per hectare, the cropping pattern in various states does not match the comparative advantage in yields practically in every state.[30] Crops for which climatic and agronomic conditions are most suitable are under-produced while there is over-production of crops which yield-wise are less advantageous to produce. This may not be entirely due to the farmers' inertia, the force of tradition and custom, and the lack of awareness of the choices open to the cultivator in the use of his land-holding. There may be solid economic reasons behind this phenomenon. Among these are the national agricultural price policy, the availability of a marketing infrastructure and facilities, and the attention paid in different regions to the development of crop production potential (including the provision of irrigation, extension services and credit facilities).

Further, there is the question of overall balancing of demand and supply with respect to each crop. The comparative advantage in yields cannot, therefore, be made the sole criterion for determining the cropping pattern in different regions and states at the national level. However, the basic points raised by the NCAER study remain: a national agricultural policy focused on maximising output from the available resources of land has yet to be formulated, and the existing policies have tended to sharpen rather than reduce the inter-regional disparities in agricultural output, incomes and employment.

Agricultural Growth and Poverty

This brings us to the third feature of performance of the agricultural sector of the economy, that is, the high growth rate of the farm sector in some parts of the country has not helped the solution of the basic problems of rural poverty and undernourishment of a vast section of the rural population. In an agrarian society like India, agricultural development is basic to the well-being of the people. In such a society, agriculture is the base of all economic activity. It is the state of the agricultural sector which determines the state of the economy as a whole. This is so because not only is the vast majority of the labour force of the country

engaged in agricultural production and derives its livelihood from it but also because the other sectors of the economy—industry, transport, commerce, construction, and services—depend on agriculture for the supply of raw materials, wage goods for the workers, demand for their products and services and, hence, revenues and merchandise for domestic trade and exports. We do not require any sophisticated economic theory to understand this patent and obvious fact.

That there is a direct relation between agricultural development and the reduction of poverty has, of late, come to be conceded. The view put forward during the first few years of the green revolution (that the type of growth that could be expected within the existing institutional structure in Indian agriculture is bound to be accompanied by a steady deterioration in the conditions, in distributional terms, of the small farmers involving not only an increase in relative inequality but also an increase in absolute impoverishment) now stands discredited by actual experience.

The National Sample Survey data suggests that not only is the incidence of rural poverty in Punjab and Haryana (agriculturally the country's two most advanced states) the lowest in the country but also 'the Gini Coefficient for Punjab and Haryana shows a statistically significant decline in inequality in the period (1957—58 to 1973–74) as a whole.'[21] In fact, a considerable portion of the population below the poverty line in these states are immigrant agricultural labourers from other states who were attracted to the former because of the greater employment opportunities and higher wage rates available compared to their native states. On an all-India basis, also, the available evidence corroborates the hypothesis that 'the incidence of rural poverty is inversely related to agricultural NDP per rural person' and that, in the case of India, 'faster agricultural growth, by raising agricultural NDP per rural person might have led to a reduced incidence of poverty.'[22] This was written in 1976 and, hence, the guarded tone. The National Sample Survey data on household consumption for 1977–78 and 1983–84 suggests that this is indeed the case. Agricultural growth during the last ten years has helped to bring down the incidence of rural poverty perceptibly, according to the data.[23] A part of this may be due to the anti-poverty programmes launched during the Sixth Plan. However, the contribution of agricultural growth over the period to this end is too patent to be ignored.

The 'trickle-down' effect of the green revolution, at least in the northern states like Bihar and east U.P., as also the spread effect of agricultural improvement in states like Gujarat, Maharashtra, Andhra Pradesh and Karnataka, have made a difference to the incidence of poverty in these states as also to the average for the country as a whole. At the same time, it cannot be denied that because of the 'bimodal' pattern of agricultural growth that we have had, the realised growth has failed to make as much impact on the poverty problem as it would have made had the growth been geographically evenly spread over the country.

Poverty is measured in India in terms of consumption expenditure of the household. Those households which have a level of income that is insufficient to purchase the amount of food that would give to every member of the household the prescribed level of daily calorie intake are classed as poor or living below the poverty line. Thus, the essential criterion in the calculation is the availability of sufficient food to the concerned households. We have around 30 million tonnes of foodgrain as buffer stock with the public sector. A computer analysis has shown that if 16 million tonnes of this stock could be evenly distributed among those at present below the poverty line nobody would be left below the poverty line in the country.

Poverty and undernourishment exist not because we do not produce enough food but because the food produced and the purchasing power thereby earned are not evenly distributed among the rural households. Suppose we had a pattern of production which provided for the growth of agriculture and increase in production at the level of small and marginal farm cultivators in the drought-prone and arid areas and the landless agricultural labour, the present imbalances between production and consumption at the macro-level would disappear. The problem of hunger amidst plenty would be solved. A dynamic equilibrium would be the simultaneous increase in demand and supply, consumption and production at the level of the poor among the farming community. This would correct the existing imbalances between production and consumption. At the same time, within the existing institutional framework and at the same level of growth, it would take care of the larger part of the problem of rural poverty. Of course, supplies for feeding the urban population would be needed but these can continue to be obtained from the surplus-producing

areas as at present. The point is that for agriculture to meet not only the nation's annual food requirement but also to improve the living conditions of the poor in the rural areas, the pattern of future agricultural growth has to be changed in such a way that the maximum attention is given to those regions and states which have been left behind in the growth of agricultural production and productivity in the country. The country should turn from a 'bi-modal' to a 'unimodal' growth pattern in agriculture . This involves policy changes which would steer the course of future agricultural development along the lines that ensure not only the desired rate of growth of agricultural output but also secures the socio-economic objectives of poverty and unemployment alleviation in the rural sector of the economy.

Seventh Plan Perspective

As stated earlier, to prepare agricultural development programmes to be included in the Seventh Plan, a Working Group was appointed by the Union Ministry of Agriculture which suggested wide-ranging changes in the programmes and approach to agricultural growth during the Seventh Plan period.

Working Group Report

The Group identified the following as the key areas of concern in the Seventh Plan period: rain-fed farming; low crop yields in the eastern region; increasing productivity of wheat; increasing cropping intensity and irrigation efficiency; toning up of agricultural administration; and, agricultural development of the tribal areas. These issues arose out of 'the lopsided development of the farm sector' over the last two decades resulting in 'not only regional disparities but also inter-crop disparities'. According to the Group, 'since the green revolution, about 94 per cent of the increase in foodgrain production came only from two crops—wheat and rice—and that too from a very small geographical base. The entire eastern region, the central belt and coarse grain-producing areas have remained unaffected (by the seed-fertiliser technology).' At the same time, the Group felt, instability in agricultural growth had been increasing. This was not entirely

due to the natural factor but was, at least in part, attributable to 'gaps and weaknesses' in the overall management of agriculture and policy action. It was the relative neglect by planners of rain-fed and dry-land agriculture and their devoting their entire attention to irrigated agriculture which was responsible for the lopsided development of the sector and the emergence of problems identified as the key issues for the Seventh Plan.

A major policy change recommended by the Group pertained to the discontinuance of the present practice of preparing a uniform scheme for the entire country. The Centre, the Group suggested, should only announce broad programmes and the states should be given the initiative and responsibility of preparing their own projects to suit their own individual conditions, needs and resources, within that framework. 'Only such an approach,' said the Group, 'will take care of the diversity of the farming situations in the country.'

A basic policy measure suggested by the Group was that the government should switch over from 'the present subsidy-oriented approach to a service-oriented approach in the official policy.' Key services (like power and irrigation) and facilities for credit, marketing, research and extension, the Group held, needed to be strengthened.

An important point made in the Group's report was that the 'lopsided,' or the unbalanced, development of the farm sector is due to the neglect of, what is euphemistically called, the 'software component of agricultural management, namely, extension inputs, quality control inputs, distribution, etc.' as against 'hardware' items like irrigation. To illustrate, this strategy has resulted in the wastage of resources and weak cost-effectiveness: the Group pointed out that five states—Andhra Pradesh, Gujarat, Madhya Pradesh, Maharashtra and Karnataka—in 1983–84 accounted for 45 per cent of the irrigation potential created but their share in the increasing foodgrain output in the post-green revolution period has been less than 22.8 per cent. 'There are,' according to the Group, 'less capital intensive alternatives to agricultural growth which should be explored.' It added that 'heavy investment is no substitute for better management.'

As is to be expected from a Working Group appointed by the Ministry of Agriculture specially to suggest improvements in the planning and execution of production programmes relating to

agricultural growth in the Seventh Plan period, its recommendations for the future were mostly in the nature of administrative reform. Understandably, the Group refrained from discussing basic policy issues. Its approach to the subject was similar to a technocrat or a management expert seeking to get the best out of the given resource allocation for accomplishing a task. The whole approach of the Group was administrative and not developmental. It contented itself with suggesting improvements in the administration of agricultural programmes, revamping of these programmes so as to provide more balanced crop production, and the correction of lopsidedness in development and regional imbalances that had appeared as a result of past planning. However, it said nothing about the change in the broad policy framework on agriculture that had become necessary. The occasion demanded a thorough enquiry into the relationship between agricultural growth and the development of the economy as a whole over the last thirty-five years; the place of agriculture in the development model that had been adopted and its consequences; the opportunities that had been missed in the field of poverty alleviation and the mitigation of unemployment in the rural areas by concentrating on development of cereal production in a small region of the country which had the initial advantage of having an efficient system of irrigation; and the distortions that had arisen as a result of planning priorities and policies in rural-urban economic relations.

Distortions in the cropping pattern, the inefficient use of available resources in the development of the agricultural sector and the sharpening of inter-regional disparities in rural incomes and the deficiencies of a centralised system of planning of agriculture in a vast country like India with so much diversity in agronomic conditions, were certainly matters requiring attention and the Working Group did pay some attention to these. But this was only a small part of what was required to be done. The need was to give a new orientation to planning by changing the role of agriculture in the development process so that not only increased agricultural production was obtained but the growth impulses in the economy as a whole would get strengthened and the benefits of development would be more evenly distributed among all classes of people instead of remaining confined to the urban elite and middle classes.

The Group, which was a body of officials of the Agriculture Ministry, could not possibly go into such matters. The decisions in

these matters had to be political and only a body competent to take hard political decisions and put them through, at the policy-making level, could take these. Obviously, this was a task for the Planning Commission and the National Development Council to undertake. Of course, the Prime Minister or the Commission as a whole with the Prime Minister presiding could have ordered a small group of experts to prepare the Plan framework for the Seventh Plan, something similar to Mahalanobis' plan-frame for the Second Plan, with the difference that instead of heavy and basic industries, the new plan-frame would give the centre-stage to agriculture in the future development effort. The emerging economic scene in the country with the deteriorating balance of trade position, growing national indebtedness and fast-rising debt-service charges, the protracted sluggishness of the industrial growth rate, and the continued intractability of the basic problems of rural poverty and unemployment after thirty-five years of planning should have occasioned a deep introspection on the development strategy and direction of planning in the country before launching of the Seventh Plan. This was not done. The result was that this Plan also treads the beaten path and is cast in the same mould as its predecessors.

Plan Provisions

The Seventh Plan document presents a wide gap between promise and performance, intentions and action on the part of the Planning Commission in regard to treatment of the agricultural sector in the Plan. The opening paras and statements in the chapter on Strategy in the first volume and the chapter on Agriculture in the second volume of the Plan document give the impression that the Commission had drawn the right conclusions on the subject of agricultural development and policy and gone all out to make the needed changes in the field. However, as one pursues the document further, a sense of disillusionment begins to take over. In essence, the development model of the Seventh Plan remains the same as that of its predecessors. The only departure in this Plan is that a few thrust areas have been identified for action in the agriculture and allied activities sector during the Plan period. This does not amount to a new approach to planning or a new policy line on agriculture in the overall development of the economy.

In the chapter on Development Perspective, the Plan document states:

> The importance of agriculture in the Indian economy, the increasing demand for food in the process of growth, the favourable income and employment implications of more intensive agricultural development and the severity of balance of payments constraints require that continued fast agricultural growth and self-sufficiency in food must remain a top priority concern of planning in India.[24]

At the same time, however, 'in planning for food self-sufficiency, adequate and balanced attention must be paid to cereals, oilseeds, pulses, fruits and vegetable and protective foods like milk, eggs, meat and fish.' In the chapter on Objectives, Strategies and Pattern of Growth, we are told: 'The Seventh Plan seeks... to emphasise policies and programmes which will accelerate the growth in foodgrains production, increase employment opportunities and raise productivity. At the present stage of development, these three more immediate objectives are central to the achievement of long term goals put forward in the [chapter on] development perspective.'[25]

It may be mentioned in this connection that at the discussion of the preliminary draft of the Approach to the Seventh Plan paper, the late Prime Minister had directed the Commission to build the Plan proposals around the triple objectives of 'food, work and productivity'. The directive was pregnant with meaning. It implied that economic growth henceforth should be sought along the lines of the development of agriculture for an increase in food production, expansion of employment opportunities to cope with the high growth rate of the labour force in the country, and improvement of productivity in farming at the margin of production, both in terms of labour and land engaged in farming operations. The directive thus implied the adoption of a new development strategy in which agriculture would form the base for building the whole superstructure of the Seventh and subsequent plans. The fact that 'productivity' was placed alongside an increase in foodgrains production and expansion of employment opportunities as a basic goal, showed that the reference was to the increase in productivity in the agricultural sector and not to the increase in productivity in general in the economy through the use of computers and high technology. The

planners failed completely to perceive and understand the deeper meaning of the three-point directive given to them. They interpreted it literally and confined their action in the matter to writing a few theoretical paragraphs on the importance of agriculture in the Indian economy and the impact of growth of the sector on the solution of socio-economic problems (like unemployment and poverty). The entire spirit of the directive was lost on them. Compliance was with the letter of the directive, which took the form of incorporation of some 'thrust programming' in the plan for the agricultural sector.

These programmes are: (*i*) Special Rice Production Programme in the Eastern Region; (*ii*) National Oilseeds Development Project; (*iii*) National Watershed Development Programme for Rainfed Agriculture; (*iv*) Development of Small and Marginal Farmers; and (*v*) Social Forestry.[26]

These are disparate programmes, each addressed to a specific problem or the achievement of a specific object. Therefore, they cannot be said to constitute a well-rounded policy thrust for the accelerated growth of the agricultural sector, which would provide not only a faster growth rate of agriculture and expanding employment opportunities to the rural population but will also take care of the problems that the unbalanced growth of the farm sector in the past has given rise to.

Apart from this, the emphasis on agriculture in the development process henceforth suggested by the 'food, work and productivity' directive was meant to resolve some of the major problems which the type of planning adopted since the beginning of the Second Plan had brought in its train and which were now assuming threatening proportions. The mounting trade and budgetary deficits; the growing resource crunch that the planners had started experiencing in the formulation of development plans; the growing burden of foreign debt and debt-service charges amidst shrinking foreign aid availability at least in real terms; the constant threat of incipient inflationary pressures in the economy bursting out at any time; the sluggish industrial growth rate which, in spite of all incentives given by the government and the deregulation of production and enterprise in the private sector, shows no sign of acceleration; and several other similar problems should have made the planners sit up and take a closer look at the earlier development model and policies to see if the model itself was not

responsible for most of the problems that had arisen. They should also have analysed whether the solution to most of these problems did not lie in a radical change in the development strategy that they had pursued so far. If they had done so, they would inexorably have been driven to the conclusion that the growth strategy would have to be changed from the development of a modern industrial base and the infrastructure connected therewith to building a sound agricultural-cum-rural base on which the superstructure of modern industry could be raised. A strong technological thrust would be needed to revitalise agriculture, improve productivity levels, accelerate the growth rates of crop production and raise the income and consumption levels of the rural population. This would secure the triple objective of 'food, work and productivity' and, simultaneously, release productive forces in the economy which would free the country from the trap of the 'Hindu growth rate of 3.5–4 per cent,' and make it more self-reliant with respect to the growth of industry, future investments, and balancing its external payment account.

This model of development, which has agriculture as the base for the whole process of expansion and multiplication of economic activity in the country, is fundamentally different from the familiar Western growth models. Except for the recent case of China, there is no historical precedent to follow for the adoption of an agriculture-based model of development. But this need not deter us from approaching the unique problems confronting us in a unique way. In fact, for Asian economies (particularly the large ones like India and China) with their vast agricultural sector which, apart from being the sole source of food supply for their peoples, contributes a major portion of their GNP and employs more than two-thirds of their labour force, only a growth model of this kind makes sense. In retrospect, it now appears that India would have done better if it had adopted this growth model from the very start as China did after her break from the USSR in the fifties. The lure of foreign aid made us opt for the growth pattern which had the effect of keeping us dependent on the advanced industrial economies for the supply of finance, equipment, machinery and technology, on the one hand, and dividing the economy, in terms of growth, into two sectors—one the modern, westernised urban sector which received all the attention in the development plans in respect of allocation of resources and, the other, traditional sector consisting

of agriculture and allied productive activities which virtually remained neglected except in the highly irrigated enclaves of crop production and, therefore, practically stagnant in respect of growth. The former came to be described by some as 'India,' the latter as 'Bharat'. This dichotomy in the approach to development, which is never openly acknowledged but has always remained the dominant part of the mental outfit of the planners as well as of the ruling elite in the country, has been primarily responsible for the imbalances and distortions in the economy that are getting sharper every day.

The compulsions of the situation, if not the directive of the late Prime Minister, Indira Gandhi, should have made the planners cast the Seventh Plan into an altogether new mould in which the development of agriculture and the rural sector was put in the lead in the growth process and the eradication of rural poverty and unemployment was made the primary objective of planning. It is indeed a pity that this has not happened.

4

Agriculture-based Development

Apart from achieving a significantly higher growth rate of farm output, rapid agricultural development holds the promise of solving the two seemingly intractable socio-economic problems of rural poverty and unemployment. Thirty-five years of planning, involving massive investments in the public sector, has failed to make any perceptible impact on the magnitude of these problems. The target group approach represented by the integrated rural development programme (IRDP), national rural employment programme (NREP), national rural labour employment programme (NRLEP), and the rural landless labour employment guarantee programme (RLEGP) for the landless agricultural labourers has also not shown much promise of success in that direction. 'Trickle-down' effects, by which much store was laid at the time of opting for a capital-intensive industry development-oriented strategy, has failed to materialise. According to the Sixth Plan document:

> The economic development during the last three decades has enabled a perceptible increase in average per capita income from Rs. 466 in 1950–51 to Rs. 730 in 1978–79, both at 1970–71 prices. In spite of this increase, the incidence of poverty in the country is still very high . . . . In the light of past experience, it will not be realistic to rely solely on the growth process to find a solution to this problem. *Specific policy measures will be needed not only to influence composition of output in favour of mass*

consumption goods but also to ensure a more even regional and class distribution of output paying special attention to stimulating growth in more backward regions (emphasis added).[27]

This would imply a reorientation of the entire development strategy from the present capital-intensive heavy industry growth model to an employment-oriented growth model, from putting the development of the heavy capital-goods producing industry in the lead to putting the agricultural sector's growth in that position. We would have had an entirely different Sixth Plan frame if the planners had followed the logic of their own statement on past failures and the need for new policy directions in planning, to solve the twin problems of poverty and unemployment. But the planners did not do that. They continued to stick to the well-trodden path. The underlying strategy of the Sixth Plan was the same as of the earlier four plans (beginning with the Second Plan).

The principal failure of planning in India is on the unemployment and poverty fronts. At the dawn of the planning era, it was a firmly-held belief that if we took care of growth, employment would take care of itself and so would the problem of poverty. Actual experience has shown this to be an illusion. The growth of employment has not kept pace even with the sluggish growth rate of the GNP (of around 3.5 per cent, and lately 4 per cent). The hope for increase in employment was pinned on the industrial sector, which was given the lead position in the development plans. The data available from the annual surveys of industries show that between 1973–74 and 1982–83, employment increased at no more that 3.7 per cent per annum while industrial output went up at the annual average rate of 5.1 per cent, and fixed capital employed in industry at a whopping 28.8 per cent. Within the industrial sector, factory employment since the beginning of the seventies is estimated to have grown at the rate of 3.5 per cent per annum as against a growth rate of 13.5 per cent per annum of fixed capital. Obviously, even if it were theoretically possible to absorb all the available surplus labour in industry, India does not have the capital resources to afford it. The Seventh Plan document frankly admits this when it says: 'The potential of direct employment generation in large scale industries and in much of the infrastructural sectors is not high because industries are fairly capital intensive.'[28]

The unemployment problem, instead of fading, has grown in

magnitude and intensity in the last three-and-a-half decades. The number of jobless now is estimated to stand as high as 100 million. Against this, the Seventh Plan provides a very misleading estimate of the usual status unemployment as being only 9.2 million for the age group 5-plus in March 1985. When related to the labour force of the 5-plus age group of 305.4 million by NSS data, this gives an unemployment rate of 3.01 per cent. The Plan document, on the basis of NSS 38th round first six months' data, also gives the average unemployment rate as 3.04 per cent for the total population (all ages) by usual status unemployment rates. With the exception perhaps of Japan, such low rates of unemployment are not enjoyed even by the most industrially advanced countries.

The live-register of the employment exchange listed 26.2 million unemployed by 1985 (as against 16.2 million by the end of 1980), showing a 62 per cent rise in the number of job seekers during the Sixth Plan period. The Seventh Plan document would, on the other hand, have us believe that the number of unemployed went down from 12 million at the beginning of the Sixth Plan to 9.2 million by its end. The Plan estimate is based on NSS 38th round results which relate to the January–June 1983 period and do not cover the whole year. These results are themselves suspect because they are based on incomplete data. Besides, experts have pointed to several definitional changes that have been made in estimating the number of jobless in the Survey data which had the overall effect of drastically reducing the number of classificatory grounds only. Further, the Plan estimate is that of the usual status unemployment which refers to chronic unemployment only. It excludes two other concepts—namely, weekly and daily status—which are far more relevant in estimating the magnitude of the problem in the Indian case. This is because of the seasonal nature of employment in agriculture and the existence of conditions of severe under-employment, on account of the very small size of holdings which cannot provide employment to the farmer's family throughout the year. It is under-employment and disguised unemployment in the rural areas that provide the hard core of the unemployment problem in India. Excluding such unemployment from the total, amounts to solving the problem by resorting to the simple expedient of refusing to recognise its existence or at least its gravity.

The Seventh Plan projections do not give hope of reducing the magnitude of unemployment, even when viewed in the severely

limited sense in which the Planning Commission employs the term. According to these projections, the net addition to the labour force in the 5-plus group during the Plan period would be 39.38 million. The backing of unemployment at the outset of the Plan, as stated earlier, has been put at 9.2 million. This gives a total of 48.58 million, which indicates the overall magnitude of employment to be generated in the Seventh Plan. Against this, the Plan envisages the generation of additional employment of 40.36 million standard persons, which means that at the beginning of the Eighth Plan, there would still be a backlog of 8.2 million unemployed remaining (which is only 1 million less than the backlog at the beginning of the Sixth Plan). Is this not in itself an admission that the problem of unemployment cannot be solved in this country with the present system of planning and the strategy of growth?

The total employment generation during the Seventh Plan has been put at 40.4 million standard-person-year (SPY). Of this, agriculture alone is to generate around 18 million SPY employment, as against 6.68 million SPY by the manufacturing, 2.2 million by the construction and 2.5 million by the transport (including railways) sectors. Within agriculture, the IRDP is expected to generate 3 million SPY and the NREP and RLEGP together 2.26 million SPY employment. The additional employment generated in the crop sector would be 6.97 million SPY and non-crop sector of agriculture, 11 million SPY.

The planners find themselves caught up in a net of their own making. Their belief that economic growth based on industrialisation would provide a complete answer to the unemployment problem, stands completely shattered. Yet they would not admit the failure of the growth model. Nothing could be more revealing of the doubts and hesitations that have come to characterise thinking on the subject in Yojna Bhawan, than the following statement in the Seventh Plan document:

> In formulating the employment strategy, a key role has to be assigned to the growth of the agricultural sector. A steady growth in agricultural production through the expansion of irrigation, increases in cropping intensity and the extension of new agricultural technologies to low productivity regions could create a large volume of additional employment because these means have high potential for labour absorption. However, the

> agricultural sector alone cannot be expected to eliminate the backlog of unemployment and absorb the additions to the labour force. The rate of industrial growth must be accelerated. However, as experience has shown, even a high rate of industrial growth would not be able to create additional employment to absorb more than a fraction of the unemployed and underemployed labour force in the organized industrial sector. Therefore, programmes of rural development and, in particular, massive rural capital formation in the form of construction becomes necessary. This strategy would also help raise the rate of growth of agriculture . Further it would increase the incomes and purchasing power of the weaker segments of the population and thereby provide demand support to the growth process.[29]

Mark the use of the qualifying 'however' in two consecutive sentences, one qualifying the planners' support for an agricultural development-based growth strategy, and the other for an industrialisation-led growth strategy. The planners appear to be torn between their dogged adherence to the latter and the logic of the present situation which demands a complete change over to the former. Their ambivalence is ominous for the future of planned development in the country as much as it is to the realisation of the socio-economic goal of eliminating unemployment. There is only one way to achieve this goal and that is the adoption of a growth strategy which will increase the employment of labour without compromising productivity. This means much greater labour absorption in agriculture simultaneously with raising substantially the productivity levels in the sector with the help of the application of modern scientific knowledge and bio-technology.

The need for a reorientation of the development model in the case of developing countries has now come to be widely recognised. The earlier belief that 'the transfer of labour from agriculture to industry (where the amount of capital per worker, and average productivity is relatively high) is the key to raising incomes and output' in developing countries, now generally stands completely shaken. One of the earliest exponents of this model, Arthur Lewis, now frankly admits that in a developing country like India 'the only way to avoid mounting unemployment is to persuade more people to remain in the country-side.'[30] 'This is one area,' he goes on to say, 'where the study of nineteenth century has

handicapped us. Our agricultural economics is based on the assumption that numbers in agriculture will decline as economic development proceeds; our policies are therefore set towards helping to reduce the number of men per acre. Instead, we shall need for the next three or four decades agricultural policies aimed at absorbing more men per acre. The experience of the past economic development cannot therefore serve as a lesson to the contemporary developing countries.'[31]

The problem in Indian economic development is that due to heavy population pressure, we cannot look to industrialisation to take over the backlog of labour unemployment, absorbing at the same time current increase in the labour force over the next few decades. If the problem of growing unemployment is therefore to be effectively met, it is necessary that conditions are created whereby agriculture, instead of releasing surplus labour, keeps within itself not only its existing labour force but also absorbs the larger part of the annual increase in the labour force due to an increase in population, at a rising level of productivity, at least over the next one or two decades.[32] As K.N. Raj puts it:

> There is little prospect that expansion of manufacturing industries and productive services will be high enough to absorb the growing labour force. There is, therefore, general recognition now that a large part of the additional employment opportunities needed has to be generated within agriculture itself, at any rate in the next one or two decades.[33]

However, it is not enough that agriculture should absorb more labour; it is equally important that it does so with a rising level of labour productivity in the sector. Agricultural incomes must rise simultaneously with increasing employment opportunities in agriculture. That itself would raise the demand for food in the countryside because a part of the additional income is bound to be spent on purchase of food by those who are at present living below the poverty line. This means they have access to less food than what they need, due to their lack of sufficient purchasing power. At the same time, agriculture will have to continue supplying the food needs of the non-agricultural population in the urban areas as at present. The total demand for food and other agricultural produce in the economy would thus go on rising as development

proceeds. How is this demand to be met? The answer is through modernisation of agriculture for securing a substantial increase of yields and crop production.

However, this raises other issues. Would not modernisation and the upgrading of farm technology be employment-destroying rather than an employment-creating and labour-absorbing process? Will not the use of improved technology and the process of modernisation call for more capital investment in agriculture? How is the need for more capital to be met? Will a higher rate of capital formation in agriculture be compatible with a rising level of consumption by labour in the sector? Will agriculture be able to meet its own capital needs for the growth process from within or will it have to call on the non-farm sector of the economy to supply its capital needs, at least in the earlier phase of its development? If the latter is the case, would not the growth of the agricultural sector be at the cost of industry and the rest of the non-agricultural sectors of the economy? These are theoretical issues, answers to which can be found in the growing literature on the subject.[34] Briefly, it has been demonstrated that far from being contradictory to the overall growth of the economy and the increase in employment opportunities, a dynamic agricultural sector in a situation like what exists in India today, can make a positive contribution to achieving higher growth rates, increasing employment opportunities, raising the rate of capital formation and securing a more balanced sectoral growth of the economy. Putting agriculture in the lead in the growth process is the only way, in the present circumstances, to achieve growth with social justice which, though the primary aim of planning from the very start, has so far eluded realisation.

Our experience of the green revolution illustrates the point. The adoption of HYV seed-fertiliser technology in Punjab, Haryana and west U.P. not only raised yields and increased crop production in the concerned areas but also considerably added to the employment potential of farm labour. Wage rates of agricultural labour in the Punjab are the highest in the country and the level of employment has risen so much that the state has to depend on east U.P. and Bihar for a large part of the needed labour supply for farm work. In per capita income, Punjab stood at the top of the twenty-one states in the country in 1978. The percentage of population below the poverty line in the state was 21.7 in 1977–78

compared to 58.5 per cent in Andhra Pradesh, 56.1 per cent in Assam, 52.9 per cent in Bihar, 65.4 per cent in Gujarat and 62.3 per cent in Kerala. In Haryana, the percentage of people below the poverty line in the same year was 24.1 per cent and in Uttar Pradesh 38.2 per cent.[35] The per capita average daily calorie intake in northern Punjab at 3,534 and in southern Punjab at 3,442 was the highest in the country.[36] Other indicators of relative development and standard of living of the people in various states also point to the same conclusion: the states with higher growth rates of agriculture have fared better than others in improving the living conditions of the people in the last three decades.[37] This confirms the view that has now widely come to be held that the key to the problem of development and improving the living conditions of the people in agrarian economies like India lies in the rapid growth of the agricultural sector and raising agricultural productivity. According to a U.S. Presidential Commission Report:

> Low agricultural productivity is an especially important cause of poverty and hunger in the least developed or food priority countries. A rough idea of the difference between such countries, where 92 per cent of the world's rice is grown, average of output per hectare and per worker. In the developing countries where 92 per cent of the world's rice is grown, average yields per hectare barely exceed 1.5 tons per year. By contrast, in the developed nations, rice yields average 5.5 tons per hectare per year. The output of individual agricultural workers in the two sectors differs even more markedly: the average farm worker in the industrialised countries is 12 times more productive.[38]

There are, of course, important differences in the conditions of agricultural production in the developed and underdeveloped countries. The land-man ratio in developed countries is high, the size of holding relatively large, the amount of capital used per hectare much larger, and the amount of labour employed much smaller than in less developed countries. As a result, productivity comparisons between the two sets of the countries are strictly not correct. But this does not, in any way, detract from the importance of the proposition that the first and foremost requirement for achieving high growth rates in economies of the less developed

countries today is the pursuit of a vigorous agricultural policy by the governments of those countries. 'If one were asked to pick a single factor as the most common cause for a low rate of economic growth,' wrote Arthur Lewis, 'it would have to be the absence of a vigorous agricultural policy.'

Policy on agriculture has to accomplish two major tasks. The first is to secure increased agricultural productivity and agricultural output by setting into motion productive forces that make for a sustained rapid growth of the agricultural sector of the economy. The growth rate of agricultural produce in the earlier phases of development has to be kept well above the population growth rate. The second (and even more important) policy goal in the case of labour surplus densely-populated countries like India has to be the more intensive use of labour in agricultural production. The increase in agricultural production is to go side-by-side with the increased employment of labour within agriculture at a rising level of incomes. Though necessary, it is not sufficient to increase yields and improve performance of the agricultural sector in terms of total production. That would not resolve the problems of poverty and unemployment, the solution of which is basic to development efforts and planning in India. Agricultural policy must directly aim at increasing the employment of labour in agriculture along with raising the levels of productivity of land and labour in the farming sector. The policy has to be comprehensive enough to combine measures to boost crop production with those aimed at increasing the level of employment of labour in the farm sector.

The conventional programmes included in the five year plans for the growth of the agricultural sector of the economy are: expansion of irrigation and area covered under high-yield varieties of seeds; increase in consumption of fertilisers and pesticides; and encouragement of agricultural research at the laboratory level and extension of its results to the field level through extension services. Before the onset of the green revolution in the country, the larger part of increased production was obtained from an expansion of the area under cultivation. The construction of large irrigation works, reclamation of wasteland through massive reclamation operations (such as those carried out in the Terai region of west U.P.), and bringing under cultivation some marginal lands that earlier had remained uncultivated because, at the commodity

prices then prevailing, it had not been found economical by the farmer to cultivate them, were the main contributors to the growth of agricultural production till the mid-sixties. After 1967, the picture changed completely. Emphasis has since been almost entirely on the use of modern technology and raising crop yields as the policy tool for achieving production targets. In fact, the policy tilt in favour of modern technology has been carried to such lengths that the need for a supportive socio-economic policy package required to make modern technology produce optimum results has ceased to get the necessary recognition. Land reform is now virtually a forgotten policy measure. It continues to be ritualistically mentioned in the successive five year plan documents but without the planners putting much store by the reforms for making any material contribution to raising the rate of agricultural growth in the country. Agricultural credit is another measure which has not received the attention it deserves in our agricultural policy-making.

Even more important is the agricultural price policy. This policy is dictated in India by the compulsions of the public distribution system which we have now come to regard as an integral part of the strategy for the management of the national economy.[39] The linking of the agricultural price policy with the needs of the public distribution system has been responsible for discouraging agricultural growth and fixing our sights regarding agricultural development on national self-sufficiency rather than on the production of agricultural surpluses for export purposes.

Increased Labour Absorption in Agriculture

An additional set of measures is required to secure a greater amount of labour absorption and increased labour employment in agriculture. Some of the more important measures in this category are: land reforms, the promotion of appropriate technology for agricultural growth, larger capital investments in the agricultural sector, and an active intervention by the state in the labour and product markets. All these measures are to be seen as parts of a single whole and not as separate entities. However, for purposes of analysis, it may be useful to consider them separately.

Land Reforms

Small-size holdings that characterise Indian agriculture are sometimes regarded as an obstacle in the way farming efficiency and raising crop yields. It is, therefore, suggested that a redistribution of land (that would not only put a ceiling on individual holdings but also fix a floor for the minimum permissible size of holdings) is essential for turning agriculture from a way of life into a profitable business like any other. This would involve fixing a ceiling in each state separately on the bases of total cultivable area available in the state; the number of bigger holdings and the area covered by them; and, the number of farmers operating holdings below a stipulated floor size and the area cultivated by them. Ceilings would be fixed in such a way that the surplus land made available by the fixation of ceilings is sufficient to provide additional land to every farmer having a holding of less than floor size. This would be an ideal solution to the problem of inequitable distribution of land which prevails at present. This would also make farming economically a more viable occupation and help in reducing the incidence of rural poverty.

On grounds of equity as well as economic rationality, there is everything to be said in favour of redistribution of land and restructuring operational holdings on the above lines through legislative action. But the structure of Indian polity being what it is, it is extremely doubtful that such a reform would come about soon, if at all. Although successive five year plans have emphasised the need for land reforms and given the measure high priority among programmes for agriculture, little progress has been made in strict enforcement of the ceiling laws passed by the state legislatures. Sufficient political will is not available even to implement the existing ceiling laws, not to speak of enacting more radical measures.[40]

Although it is a serious handicap, it need not hold up policy action for accelerating agricultural growth in the country. That agricultural development is not possible without land reforms is open to question. As Doreen Warriner, a keen observer of the Indian scene, has pointed out:

> In India the question of the relation of reform to development is highly problematical because although it seems wrong and

> unwise that so much legislation should have been enacted without being implemented, yet in the present political situation, the ceiling legislation cannot be implemented and in the present economic situation it is difficult to believe that the tenancy position can be improved.... Agrarian reforms really do liberate.... But no conclusion emerges that agrarian reform is necessary to development. It is unfortunately customary to prove that reform is a condition of development by using Humpty-Dumpty definitions.... It can only be regarded as such if all other things needed for growth will [can?] not be undertaken without it.[41]

So we have to proceed to formulate an appropriate agricultural policy, taking the existing distribution of land holdings as a given premise. The existing situation may not, after all, be all that disadvantageous. On the contrary, it may turn out to be an advantage to have small size holdings so far as labour absorption in agriculture and the productivity of land are concerned. This is so 'because small holdings systematically employ more labour per hectare than large holdings. And there need be no loss of productivity per hectare because, given access to credit and material inputs, small farms yield more output per hectare than large farms.'[42] Farm management studies in India show that the intensity of cropping decreases and labour employed in terms of mandays used per hectare goes down as the size of farm increases.[43] In Ferozpur (Punjab), for instance, data on the intensity of cropping and mandays used in cultivation from 1968–69 to 1969–70 showed that the intensity of cropping was 143.7 per cent and mandays used per hectare were 103.9 for farms below 6 hectares (compared to 135 per cent and 84.6 days respectively on farms of 6–9 hectares), 134 per cent and 83.9 days respectively on farms of 9–14 hectares in size, and 109.6 per cent and 53.9 mandays respectively on farms above 24 hectares. Similar evidence is available with respect to districts in U.P., Tamil Nadu and Assam.[44]

The inverse labour-input farm-size relationship phenomenon holds good almost universally in Asian agriculture. In Taiwan, for example, where agriculture is no more of the traditional type and is passing through a transitional phase, labour input in farms below 0.5 hectare in size in 1977 was on an average 503.7 mandays per hectare of cultivated area, compared to 203.7 mandays on farms of

over 2 hectares in size.[45] Labour input data of farming from Japan, while confirming the inverse relationship between labour input and farm size, provides another interesting piece of information: labour input per hectare decreases over time as the country's economy develops, incomes outside agriculture rise and non-agricultural employment expands. Thus, labour input in Japan per hectare per year on farms between 0.5 to 1 hectare in size was, on an average, 924 mandays in 1922, 815 mandays in 1952 and 353 mandays in 1975. The corresponding figures for farms of over 2 hectares in size were 510, 465 and 204 mandays, while the average for farms of all sizes was 666, 672 and 267 mandays respectively for 1922, 1952 and 1975.[46]

As the Indian economy develops, and incomes and employment outside agriculture expand, there may be less need of labour absorption in agriculture for the country and labour input in small farms may fall as in large farms. Still, as Japan's example shows, the inverse labour-input farm-size relationship is likely to persist.

Several explanations are available for this phenomenon. One obvious explanation for the higher labour inputs in smaller holdings is that these holdings consist of better quality land which is more profitable to cultivate intensively.[47] Hanumantha Rao found a part of the explanation, albeit indirectly, in the fact that small farms are better irrigated. According to him, 'those who had to settle down originally on small holdings, because of lower incomes, have been making improvements on the land over several generations through the application of family labour and this has resulted in an inverse correlation between farm size and the productive capacity of the land.'[48] Another explanation of the inverse relationship is that in the smaller farms, cropping intensity is greater and multicropping is the normal practice. More valuable crops requiring far more careful tending are raised. Intensive land use which is a characteristic feature of China's agriculture has, together with continuous genetic improvement and excellent field management, enabled China to get 'triple cropping over large areas, producing yields from 16 to 18 tonnes of foodgrain per hectare and in some cases up to 22 tonnes. Experimental quadrupling has been reported.'[49] Such intensive agriculture is possible only on small farms as all the available evidence from India, Pakistan, Bangladesh and Indonesia suggests that cropping intensity falls as the farm's size increases.[50]

Another explanation of the inverse labour-input farm-size relationship put forward by Khusro is that as farm size increases, the 'land taken in on lease and cultivated on the basis of tenancy increases as a percentage of total land' and since 'farmers apply themselves and other inputs qualitatively better on their own lands than on lands leased in,'[51] labour input declines as the farm size increases. Yet another explanation for greater labour input on smaller farms than on larger ones is that labour applied on small farms is usually family labour, which is priced much lower than the going market rate of wages. As the farm size increases, the size of family members does not increase proportionately and, therefore, labour input decreases with an increase in farm size.[52] Some other explanations put forward are: (*i*) apart from various factors inducing the farmer to use more labour per unit of cultivated area, there are forces which compel him to do so, and (*ii*) that the proportion of hired labour declines as the farm size increases.

It is not necessary to go into the details of these explanations and their validity. What is important for us to note in the present context is that the existing state of affairs with regard to land distribution and the preponderance of small size holdings in India's agriculture is conducive rather than inimical to the achievement of policy goals of greater absorption of labour in land cultivation and raising the level of agricultural productivity in the country. More egalitarian distribution of land through land reform measures will be useful but is not an indispensable condition for securing increased labour employment and increasing land productivity in the present stage of development of the Indian economy. After fifteen or twenty years when the non-agriculture sector expands sufficiently to draw out surplus labour from the agricultural sector for employment in the manufacturing and services sectors, it may be possible to organise farming on a larger scale. In that case, it will become prudent to frame rules for the sale, purchase and registration of land deals in such a way that market forces gradually bring about change towards larger-scale farming.

Technological Progress

Technological advance is necessary to achieve the desired breakthrough in accelerating the rates of growth of agricultural productivity and agricultural production. The fertiliser-HYV seed revolution

demonstrated the potential of what could be achieved by way of an increase in agricultural production through the use of modern technology in farming.

In this connection, it may be instructive to note that the incidence of poverty in the country is the lowest in Punjab, Haryana and west U.P., where the use of HYV-fertiliser technology has advanced the most. On the other hand, states in eastern India, Assam, Bihar, Orissa and West Bengal show very high levels of poverty. In a linear analysis of cross sectional evidence from five agro-climatic NSS regions, Pranab Bardhan found that the percentage of rural popualtion below the poverty line in a region in 1972–73 was negatively and significantly related to the average annual rate of growth of crop output in that region. Further, he found 'that the farm wage rate is positively associated with productivity enhancing factors, such as use of fertilizers, soil quality index, lower deficit in actual rainfall compared to the normal... rainfall.'[53]

Some idea of the relationship between the incidence of rural poverty and agricultural progress in a state in recent years may be had from Table 4.1 which identifies the growth rates of agricultural production during the period 1969–72 to 1982–84 in the major states along with the incidence of rural poverty in each state in 1977–78.

There are obvious difficulties in interpreting Table 4.1. Growth rates and the percentage of rural people below the poverty line are given for the state as a whole in each case. But within a state, there are great regional variations in both these respects. The most glaring case is that of U.P. Western U.P. is far ahead of the eastern, southern and Himalayan regions of the state in agricultural growth and the incidence of poverty there is far below the national average. Yet, for the state as a whole, the percentage of people below the poverty line is practically the same as the national average (see Table 4.1). Secondly, Table 4.1 gives the growth rates of agricultural production on a three year average basis from 1969–72 to 1981–84 but the data on poverty is for a single year (namely, 1977–78). If the agricultural growth rate is to be related to the incidence of poverty, we have to compare growth in agriculture with growth in the alleviation of poverty or reduction in the incidence of poverty. The time series data on the incidence of rural poverty for each state over a twenty to twenty-five year period is

Table 4.1
State-wise Growth Rate of Agricultural Production and Percentage of Population Below the Poverty Line

State	*Annual Growth Rate of Agricultural Production (1969/72–1981/84)*	*Percentage of Rural Population below Poverty Line in 1977–78*
Andhra Pradesh	3.61	43.89
Assam	1.78	52.62
Bihar	1.17	58.61
Gujarat	2.53	43.20
Haryana	2.34	23.25
Karnataka	1.87	49.58
Kerala	−1.58	46.00
Madhya Pradesh	1.67	59.82
Maharashtra	4.77	55.85
Orissa	1.87	68.97
Punjab	3.59	11.87
Tamil Nadu	0.57	55.68
Uttar Pradesh	2.66	50.23
West Bengal	−0.25	58.94
All-India	3.05	50.82

not readily available. Third, agricultural growth is a major, but admittedly not the only, factor contributing to the lessening of poverty. Agricultural growth rate in a state may remain low and yet there may be a decline in the incidence of poverty over time because of other factors. This is the case, for instance, in Kerala.

With all these limitations in mind, one can still argue that, broadly, the states which have shown significant growth in agriculture have succeeded in reducing the percentage of rural population living below the poverty line and that the incidence of rural poverty is lower in agriculturally advanced states compared to those which have lagged behind in agricultural growth. On one side of the spectrum of rural poverty stand the agriculturally highly advanced states of Punjab and Haryana which have the lowest ratio of rural people living below the poverty line; on the other, are Orissa, Bihar, Assam, Madhya Pradesh and Tamil Nadu where the average growth rate of agricultural production is much lower and the percentage of people below the poverty line in rural areas is much higher than the national average.

This result is important because of the policy implications it

carries. Agricultural growth in the country since the mid-sixties has been more the result of an improvement of farm technology than of an expansion in the area under cultivation. If the incidence of poverty has gone down with accelerated growth of agricultural production wrought by technological transformation, this shows that technological progress in agriculture has a positive effect on resolving the problems of rural poverty and unemployment rather than aggravate them, as was feared in some quarters at the start of the green revolution.

Technological progress can be broadly divided into two categories—biological and mechanical. In the first category fall technological advances pertaining to getting more produce per unit of land. This is land-saving, in contrast to mechanical technological advances that are labour-saving. Encouragement of research in the biological field and the expansion of extension service as well as the improved delivery of needed inputs (like fertilisers, high-yielding variety seeds and pesticides); subsidisation of input sales to small and marginal farmers; and the provision of liberal credit facilities for purchase of costly inputs to the weaker sections of farmers are all obviously unobjectionable policy measures. These will raise agricultural growth rates and income levels and, at the same time, provide more on-farm work for agricultural labour.

Difficulties arise when one talks of mechanisation of farm work. It is contended by some people that the advance of mechanisation in agriculture will result in increased unemployment because machinery is labour-saving. This argument appears to be plausible but, on closer scrutiny, even this loses much of its strength. The most important mechanical technology relevant to agriculture is irrigation. This is almost invariably production and employment enhancing rather than employment destroying and wage reducing technology. Even the use of tractors and threshers has, in practice, been found to be associated with an increased demand for labour and a rise in wages. The case of Punjab and Haryana illustrates this point. Punjab's own labour has been found to be insufficient to cope with increased farm work following the green revolution. For harvesting operations and, of late, for transplantation of seedlings in paddy cultivation, a large part of the labour force employed in these states (particularly in Punjab) is drawn from east U.P. and Bihar. By reducing the number of days required for farming operations—like ploughing, harvesting and threshing of the

crop—tractors and harvesters make multicropping on an operational holding possible and thereby add to production as well as to the employment potential of the farm.

However, as shall be seen in Chapter 5, HYV-fertiliser technology is rapidly becoming obsolete in the face of the revolutionary advances made by bio-technologies like genetic engineering and bio-fertilisers. It is to the latter type of farm technology that we have to look to in this country for raising the productivity levels in regions of unirrigated agriculture, which are also the areas of the highest incidence of poverty. The emerging bio-technologies open up revolutionary possibilities for India, as indeed for other developing agricultural countries, to achieve simultaneously the twin goals of a fast growth rate of agricultural production and rapid advance towards elimination of rural poverty. Technological advance is the key link in both agricultural and social transformation in India today.

Capital Investment

In the colonial economy, the agricultural sector suffered neglect in the matter of capital investments. The general view was that agriculture, being the major sector of material production, was to serve as the main source for capital accumulation in the economy. But the economic surplus produced by it was to be taken out for investment in the capitalist industrial sector and for providing an infrastructure for the urban sector of the economy. This view continued to hold ground for some time even after the end of colonial rule. However, the difference was that large public sector outlays on irrigation, power and various other programmes aimed at improving the performance of the agricultural sector came to be made a part of planned development effort, from the beginning of the planning era.

With the introduction of new farm technology and the increasing commercialisation of agriculture, the picture regarding the role of capital in the agricultural sector from the point of view of the individual producer has undergone a radical change. Agriculture has come to be regarded, at least by all those with holdings above 2 acres of irrigated land, as a business enterprise like any other business. A farmer needs funds to meet both his working capital and long-term investment needs (like installing a tubewell

on his farm, constructing drainage and other water management/ and improvement works and building storage godowns). He needs short-term crop loans as well as medium-term and long-period loans for the purchase of inputs, machinery, animal stock and the construction of various on-farm facilities. He may be able to generate a part of the capital needs himself from his own farm operations, though for small and marginal farmers even that is not conceivable. For the larger part of his needs, he will have to seek credit from outside agencies. In any case, if farming is to be modernised and agricultural productivity is to be substantially increased, agriculture in India has increasingly to become 'capitalist' in character, in the sense that, as a factor of production, capital has to play an increasing role in agricultural production in future.

This raises two policy issues. The first is the policy on agricultural credit, and the second on official encouragement to deepening and widening the capital base in Indian agriculture. On the need for rapid expansion of credit facilities to the farmer in all parts of the country from financial institutions, there is no difference of opinion. A consensus has emerged in the country that credit facilities to the farmer should get high priority in the programmes of modernisation and development of agriculture. The nationalised commercial banks were charged with the responsibility, by the Union Finance Ministry, to apportion 34 per cent of their advances to the 'priority sector,' which included agriculture, small scale industry, and the low income weaker sections of the people. Of this 34 per cent, 16 per cent is to be exclusively for agriculture. An apex institution, the National Bank of Agriculture and Rural Development, has been started to provide refinance facilities to regional rural banks and cooperative institutions (including land mortgage banks that take care of the medium-term credit needs of the farmer). Admittedly, the present credit facilities are still inadequate and, by and large, do not reach the small and marginal farmer. They need to be strengthened. At the same time, more attention has to be paid to recoveries in the agricultural sector. The recovery situation, of late, has shown considerable deterioration. This should be a cause of serious concern not only to the financial institutions but to the policy-makers as well. A considerable part of the default in the repayment of debts by farmers is reported to be wilful.[54] This needs to be stopped by impressing upon the agriculturists that an uninterrupted flow of

credit to the sector can be maintained only by recycling the available bank finance. Politicians have an important role to play in creating the needed consciousness among the farmers.

Giving a capitalist orientation to agricultural production in the country by encouraging the extensive mechanisation of farming operations is, however, a policy option that requires closer examination. Apart from ideological underpinnings, opposition to the policy of increasing capital intensity in Indian agriculture arises from a genuine fear of machinery displacing labour and adding to the gravity of an already bad employment situation in the agricultural sector. This fear is based on the view that since the opportunity cost of labour to the big land holders is almost always higher than the cost of employment of machinery by him for doing the same quantity of work, they would prefer employing labour-saving machinery to employing more labour as agricultural operations expand and production increases. The apprehension in the Indian case, at least, is more imaginary than real. For, in the first place, the category of landlords that will employ machinery in place of labour on any significant scale does not exist in this country. In any case, the ceiling laws, however weakly enforced, rule out the existence of very large farms which easily lend themselves to the mechanisation process. Secondly, the apprehension assumes that there is a fixed amount of farm work available and that the cropping intensity cannot be changed. Where new short-duration crops become available and multicropping becomes possible, the use of machinery for harvesting, ploughing, and other similar operations becomes not only desirable but also somewhat of a necessity. Saving of time in agricultural operations (like ploughing and harvesting) is the essence of the matter in multiple cropping and only the use of machinery can do this. Machinery, in this context, becomes land-saving rather than labour-saving. Its use adds both to crop production and labour employment in the country. This has been amply demonstrated by the experience of areas under the green revolution. The increasing use of electric motors, tractors and, on a limited scale, harvester combines in the wheat belt in the north has been accompanied by an increase in the demand for labour. In Punjab alone, about 4 lakh migrant labourers from east U.P., Bihar, Orissa and Nepal are reportedly employed annually in wheat harvesting operations. One need not, therefore, be distrustful of the policy of encouraging the growth of capital-

intensive production in agriculture or the mechanisation of farming operations. This is a part of the growth process and has to be seen as such.

Market Intervention by the State

Planning does not imply merely the allocation and direction of investments into different sectors of the economy; it also calls for the adoption of appropriate policies of intervention by the state into the working of market forces, both in respect of product and factor prices, to achieve the accepted plan objectives. A major weakness of Indian planning has been the lack of effective policy support for resource allocation in five year plans for the achievement of the set goals. Resource allocation to agriculture and irrigation has not been accompanied by the adoption of an appropriate agricultural price policy; the necessary restructuring of agricultural organisation and the rural economy; the exploitation of our vast reservoir of manpower for capital construction in agriculture and increasing agricultural output; and the bridging of the wide gap between urban and rural incomes. If anything, income inequalities (both inter-sectoral and inter-regional) have increased rather than decreased in the last thirty-five years of planning.

The agricultural price policy, judged by the terms of trade that the agriculturist has got since the beginning of planning, has been inimical to the growth of agriculture. Table 4.2 gives the index of wholesale prices of agricultural products, relative to manufactured products, from 1950–51 to 1983–84.

It will be seen from Table 4.2 that barring 1967–68 and 1969–70, and excluding 1970–71, the base year of parity prices, agriculture always had adverse terms of trade relative to manufacturing. The agricultural price policy, thus, stands in sharp contrast to the rising public investments for agricultural development over the last three decades. It has been asserted in some quarters that 'in contrast to the accumulated evidence for the sensitivity of intercrop allocation of acreage to relative crop prices, there is very little hard evidence that agricultural output as a whole is significantly responsive to the relative price of agriculture to non-agriculture.'[55] Or that, 'while the choice of crop is much influenced by relative prices, the aggregate supply of foodstuffs is not very sensitive to changes in prices.'[56]

Against this, it may be pointed out that what is required is the

Table 4.2
Index of Ratio of Wholesale Price of Agricultural to Manufactured Products (Base: 1970–71 = 100)

Year	*Index*	*Year*	*Index*
1950–51	98.1	1968–69	97.0
1951–52	92.3	1969–70	103.4
1952–53	87.1	1970–71	100.0
1953–54	86.6	1971–72	91.7
1954–55	80.9	1972–73	90.5
1955–56	80.3	1973–74	99.8
1956–57	83.7	1974–75	100.6
1957–58	84.0	1975–76	91.9
1958–59	87.6	1976–77	90.5
1959–60	86.7	1977–78	97.1
1960–61	82.9	1978–79	95.6
1961–62	81.8	1979–80	87.6
1962–63	81.2	1980–81	81.9
1963–64	81.0	1981–82	87.4
1964–65	91.8	1982–83	91.2
1965–66	94.7	1983–84	95.6
1966–67	98.4	1984–85	94.9
1967–68	100.3	1985–86	90.4
		1986–87	90.4
		(December 1986)	93.1

Source: Pranab Bardhan, *The Political Economy of Development in India*, Delhi, OUP, and *Economic Survey, 1986–87*.

data of production trend over a sufficiently long period in a developing country which had deliberately followed a favourable agricultural price policy to prove the point that such a policy would promote agricultural growth. Such instances are difficult to come by because, under the influence of the Western growth models, most of the developing countries which got freedom from colonial rule after World War II, equated economic growth with industrialisation in their development plans. Their price and fiscal policies favoured industrial rather than agricultural growth. China is the single example of a developing country in the last three decades that has systematically sought to promote agriculture and rural development through, among other things, a favourable agricultural price policy. The terms of trade between agricultural produce and factory products were deliberately kept tilted in favour of the former. The result has been the achievement

of a respectable 4 per cent annual compound growth rate in agriculture by that country over a thirty-year period from 1952–53 to 1982–83. In the last six years, because of the responsibility system which gave the farmer even better prices, there has been a further improvement in the agricultural growth rate in the country to 6 per cent per annum. Again, there is a basic flaw in the argument of those who hold the view that the growth of agricultural production is more responsive to public investments in irrigation and other agricultural improvements than to a favourable price policy.[57]

The question is not of a choice between two policy alternatives for securing a given rate of agricultural growth. Rather, it is of achieving the fastest possible growth rate to make the country self-sufficient in agricultural production; raise the living standards of the agricultural population; alleviate poverty, hunger and unemployment in the rural areas; and, provide an ever-expanding market for industrial goods in the rural areas in a dynamic setting. This would require increased investments in the agricultural sector as well as incentive prices to the farmer that would induce him to make capital investments and use costly inputs to get higher yields. A favourable agricultural price policy is advocated in this larger perspective of the country adopting a strategy of economic development that gives primacy to agricultural development over industrial growth. Once the superiority of that development strategy in India's case is accepted, the case for adopting a favourable agricultural price policy as a complement of that strategy would need no further arguing. A favourable price policy is not to be pitted against larger capital investments by the state in agriculture as alternative policy measures for agricultural development. The two are complementary to each other. The point being made here is that larger capital investments will not produce the desired growth results unless these are backed by the policy of paying incentive prices to the farmer.

Subsidies

An allied question of price policy is the subsidisation, by the state, of agricultural inputs and output. The subsidies have, of late, assumed serious proportions for the public exchequer. The subsidy on fertilisers paid from the Central government exchequer now

comes roughly to Rs. 2,000 crore a year while losses incurred by state governments on the supply of irrigation water and power to the farmers, which is a hidden subsidy, come to another Rs. 500 crore. Thus, around Rs. 2,500 crore is being spent annually by the Central and state governments on subsidising agricultural inputs while another Rs. 2,000 crore is being spent by the Central government to subsidise the maintenance of buffer stocks as well as to subsidise the food consumption of the urban population (which is the main beneficiary of the public distribution system). The subsidies on inputs are aimed at keeping down the cost of cultivation and encouraging crop production without, in any way, ensuring that the benefits of lower costs and increased production will be passed on to the consumer; those on the supply of foodgrains are aimed at keeping down prices for the consumer. Insofar as the effect on agricultural production is concerned, the latter counters that of the former category so that the overall effect of all the subsidies on agricultural production is hardly any, or perhaps even negative, if we take into account the fact that in order to keep down prices at the ration shop and the cost of food subsidies to it, the Central government's constant endeavour is to keep procurement prices as low as is economically and politically feasible.

The burden of the subsidies on the exchequer continues to grow. Table 4.3 shows the growth in subsidies on food and fertilisers from the national exchequer since 1970–71.

From a mere Rs. 250 crore in 1975–76, the total subsidies under the two heads rose to Rs. 3,893 crore in 1986–87 according to the revised budget estimates. The final figure is likely to be more than Rs. 4,000 crore, which is sixteen times the amount spent in 1975–76.

There was a sudden spurt from Rs. 1,048 crore in 1983–84 to Rs. 1,832 crore in 1984–85 in the amount of fertilisers subsidy. This was accounted for by a 7.5 per cent reduction in the administered price of fertiliser given that year by the government. This reduction, together with a 10 per cent discount given on the sales from the accumulated stock of fertilisers with the Food Corporation of India, was an important contributory factor to the welcome spurt in grain production in the country from 129.5 million tonnes in 1982–83 to 152.4 million tonnes in 1983–84. This shows that the price of fertilisers has a direct bearing on agricultural output and that subsidisation of fertiliser consumption from the exchequer is a

Table 4.3
Central Government Subsidies on Food and Fertilisers
(Rupees Crore)

Year	*Food*	*Fertiliser*	*Total*
1970–71	18	—	18
1971–72	50	—	50
1972–73	117	—	117
1973–74	251	—	251
1974–75	295	—	295
1975–76	250	—	250
1976–77	506	60	566
1977–78	480	266	746
1978–79	570	343	913
1979–80	600	644	1,244
1980–81	650	466	1,116
1981–82	700	386	1,086
1982–83	710	648	1,358
1983–84	835	1,048	1,883
1986–87 (Budget)	1,750	1,950	3,700
1986–87 (Revised Budget Estimates)	2,000	1,893	3,893
1987–88 (Budget Estimates)	2,000	1,910	3,910

part of public investment in the agricultural production programmes of the plans. As can be seen from Table 4.3, subsidisation began in 1976–77. It was the result of OPEC's action in 1973–74 of hiking the price of crude oil. The rise in the cost of naphtha sent up the price of fertilisers in the world market. The price of imported fertilisers as well as the cost of production of the domestically produced fertilisers increased. The pool price of fertilisers had, therefore, to be raised. However, this made the use of fertilisers in adequate quantities uneconomic for the farmers at the prices given to them for their produce, which were kept down by government control of the food sector through procurement and the public distribution of grain. Hence, the decision to subsidise fertiliser supply to the farmer.

But the subsidy now costs the exchequer over Rs. 1,900 crore a year. This high cost, however, raises the question of how far and how long the country can go on subsidising fertiliser consumption. The fertiliser needs of Indian agriculture have been estimated at 20 million tonnes by A.D. 2000. The present level of consumption is 8–9 million tonnes. The subsidies, assuming that the present rate

of subsidy continues, would amount to Rs. 5,000 crore in A.D. 2000 at the 1984–85 prices. Can the country afford it? If not, is there an alternative policy choice available? The country has to think of alternative, preferably renewable, sources of energy for agriculture, in place of chemical fertilisers. There is, of course, a considerable potential available for the development and exploitation of the traditional kind of manure. An all out effort should be made as a part of the manure policy to put to effective use the available resources. But that will not significantly reduce the demand for chemical fertilisers.

There are two solutions to the problem of financial burden that the subsidisation of fertiliser consumption is going to impose increasingly on the Central exchequer in the years to come. The first is that the fertiliser consumption by marginal and small farmers only should be subsidised. Other farmers should be asked to pay the competitive market price for the supplies that they want. This, however, would be possible only if they are allowed to sell their produce, foodgrains and commercial crops, at competitive prices in the market and there is no market intervention by the state in the commodity market on behalf of the consumer. Second, the management of public sector fertiliser plants should be improved and the working of the fertiliser industry should be made far more efficient than at present to make it competitive with the world fertiliser industry.

The issue of food subsidy also raises similar questions and remedies should be sought along the same lines as well. The whole question of continuing with the public distribution system (which has long since outlived its utility) needs to be re-examined in the light of the new situation that has arisen in the food sector of the economy. The larger part of subsidy expenditure on foodgrains is now accounted for by the cost of maintaining buffer stocks by the Food Corporation of India and not by the benefit received by the consumer on this account. In the circumstances, the whole system of public distribution, and carrying buffer stocks of the order of the present size, has become an item of colossal waste of public funds. The expenditure under this head has ceased to serve any social purpose. Contrary to the general belief, food subsidies, at present, are not of so much help to the poor as they are to the army of 5,000 officers and 40,000 subordinate administrative staff employed in the Food Corporation of India.

Seventh Plan Response

The Approach Paper of the Seventh Plan raised hopes of a major change in the development strategy when it stated that the 'Plan must emphasize policies and programmes which will accelerate the growth of foodgrain production, increase in employment opportunities and what is equally important, raise productivity.' The paper emphasised that henceforth: 'Instead of relying on general economic growth for raising employment opportunities without any special effort to give employment orientation to this growth, *it is necessary to treat employment as a focal point of policy*' (emphasis added).[58] To achieve a sustained growth of employment opportunities, it was deemed necessary to focus on the expansion of agricultural production and modernisation of the sector. According to the Approach Paper:

> The strategy of the Seventh Plan will be to generate productive employment through increase in cropping intensity and the extension of the new agricultural technologies to low productivity regions and small farmers, through measures to make the rural development programmes more effective in the creation of productive assets, through the expansion of labour-intensive construction activities for providing housing, urban amenities, road and social infrastructure, and through change in the level and pattern of industrial growth.

In effect, the plan was promised to be an employment rather than a purely growth plan as such. 'Programmes and policies,' it was affirmed, 'have to be oriented to the objective of providing productive employment to everyone seeking it and, in every sector, priority has to be given to activities which contribute most effectively to this purpose.'

The special rural employment programmes earlier put into operation would be continued but, in the Seventh Plan, these would be 'integrated with agricultural and rural development as far as possible by moving them to create infrastructure such as drainage and field channels, roads and infrastructure required for growth of small-scale industries.' The point that 'in rural areas employment has to be promoted through agricultural and through the expansion of off-farm employment in agro-based rural indus-

tries and services' was underlined by the Approach Paper, which went further to stress the importance of securing a perceptible improvement in the performance of the agricultural sector and the acceleration of the growth of foodgrain production if non-inflationary growth in employment was desired.

There were other indications in the Approach Paper suggesting that the planners were giving up the earlier growth model in favour of one that would make agricultural development the key element in the total development process. The biggest potential for growth existed in the agricultural sector, inasmuch as looking at 'the composition of agricultural growth (in the past) crop-wise and region-wise there was a major gap... between potential and actual achievement.' This difference was 'far too wide, particularly in areas where poverty is most endemic'.[59] For both the removal of poverty and securing accelerated growth of the economy, therefore, the obvious thrust had to be towards a rapid increase in productivity in low productivity areas and in crops such as rain-fed rice, coarse grains, oilseeds and pulses.

The earlier growth model which sought economic growth and the removal of poverty in rapid industrialisation was now declared to be only a partial success in achieving its objectives. Even industrial growth in the Indian context has been found to be contingent on the existence of a strong agricultural base in the economy. The remarks of the Planning Commission on this point are so pertinent that these deserve reproduction *in toto*:

> Though the impetus for a large expansion in employment has to come from agriculture, the potential of the industrial sector cannot be minimised. The tendency has been to see industrialisation as a means of building economic strength and promoting self-reliance, but in the ultimate analysis it is indispensably linked with the removal of poverty. *At present a major constraint on industrial growth is the unsatisfactory rate of agricultural growth, which limits the possibilities of non-inflationary industrial expansion in a variety of ways*. Shortfalls in food availability lead to price rises which erode investible surpluses; the slow growth in agricultural inputs used in industry limits the pace of advance in certain key sectors; most important, a slow rise in agricultural productivity can lead to a deficiency in demand for industrial goods (emphasis added).[60]

It is only after the 'agricultural constraint is loosened that it becomes possible to plan for higher industrial growth rates.'

With the basic priorities set as 'food, work and productivity' for the Plan, the strategy of the Seventh Plan was promised to be

> built around higher agricultural growth and creation of employment, improvement in efficiency and in quality of production and technological upgradation in industry and infrastructure, the use of less capital-intensive and more labour-intensive techniques and a shift in investment priorities towards mass consumption and measures to improve the quality of life.[61]

Implicit in opting for the new strategy was the admission that what suited the Indian situation was the agricultural-development-led-industrialisaltion (ADLI) growth model rather than the heavy industry led growth model adopted with the beginning of the Second Plan. The latter model was a highly capital-intensive development model which, with the growing resource crunch faced by the planners, had become unworkable. It needed to be replaced by a less capital-intensive and more labour-intensive growth model. The proposed strategy change would help 'in lowering the capital-output ratio' and through it in meeting the challenge of the resource-crunch that the planners were facing.

If the Seventh Plan had embodied all this in letter and spirit, we would have started a new chapter in our development history. But, alas, this has not happened. If one goes by the letter of the Approach Paper, there is perhaps nothing much to complain about regarding the final Plan document not living up to the promise contained in that paper. So far as the growth strategy and model are concerned, however, the latest plan continues to be cast in the moulds of its predecessors, which makes it indistinguishable from them.

The planners themselves admit as much, albeit implicitly, when they state in the objectives and strategies chapter of the final document:

> The Seventh Plan... seeks to emphasize policies and programmes which will accelerate the growth in foodgrains production, increase in employment opportunities and raise productivity. At present stage of development these three more immediate objectives are central to the achievement of long term goals....[62]

Two points stand out clearly: first the change envisaged under the accepted 'food, work and productivity' approach is merely one of a shift in emphasis on programmes and policies bearing on these subjects and not in the basic development strategy or growth model; and, second, the contemplated change is the result of expediency and not of realisation on the part of the planners, of the shortcomings of the existing strategy and the need to reform it. They seem to be suffering from a mental block, which prevents them from thinking on new lines and adopting an alternative growth model or a strategy for development that would make planning in the country more meaningful and, in socio-economic terms, more fruitful.

The development design suggested by the Approach Paper was:

(*a*) Economic growth would be sought through accelerated growth and newly acquired dynamism of the agricultural sector which serves as a catalyst or trigger for the growth of the economy as a whole;

(*b*) the solution of the endemic problems of poverty and unemployment would be found in modernisation of agriculture, raising productivity levels in it and widening the scope of economic activity in the rural areas, with a view to providing expanding employment opportunities at rising levels of incomes to all sections of the rural population, particularly the poor;

(*c*) goals in planning, henceforth, would be set in terms of the generation of a certain volume of employment and increase in labour earnings in the time-frame of five years of a plan rather than in terms of GNP of a particular order;

(*d*) to impart dynamism to the agricultural sector, a vigorous technological thrust would be provided to develop rainfed and dry-land agriculture (which covers 70 per cent of the cultivated area but accounts for only 42 per cent of crop production in the country);

(*e*) low-cost high-yielding technologies suitable for small and marginal farmers would be developed and made easily available to the small and marginal farmer in a bid to raise his productivity and income levels;

(*f*) poverty alleviation and employment generation programmes would be integrated into capital construction and growth

processes rather than allowed to continue as social relief measures; and

(*g*) in general, a policy reorientation would be effected to favour the growth of production, income, and employment in the rural sector of the economy so that a sound base is laid for the equitable and sound future growth of the economy as a whole.

This is a complete development design which, if properly implemented, would not only help in resolving the problems of poverty, unemployment, growing income and wealth disparities among the people and different regions of the country, and the rising social tensions, but would also remove many hurdles (like growing external payments and budgetary deficits, inadequacy of financial resources to meet planning needs, and the ever-present threat of starting yet another inflationary spiral in the economy).

This design is conspicuous by its absence in the Seventh Plan as it has emerged in its final version The Plan document does acknowledge the preeminent position agriculture occupies in the Indian economy:

> Agriculture occupies a key position in the Indian economy because of its contribution to overall economic growth through supplies of food, raw materials and exports. It is a source of livelihood for a majority of the population and provides a large market for non-agricultural goods and services.[63]

After beginning on this highly promising note, the chapter on Agriculture and Allied Activities in the Plan document has nothing more to offer than a few programme thrusts, such as:

(*i*) Special Rice Production Programme in the eastern region;
(*ii*) National Oilseeds Development Project;
(*iii*) National Watershed Development Programme for Rainfed Agriculture;
(*iv*) Development of Small and Marginal Farmers; and
(*v*) Social Forestry

This does not even make an integrated plan for the development of the agricultural sector, leave alone a strategy for triggering the

growth of the economy as a whole through the development of agriculture. The chapter in the Plan document on agriculture stands in complete isolation from the other chapters, with little evidence of any thought having been devoted in Yojana Bhawan to linking agricultural development growth to other sectors of the economy or to the solution of the problems of poverty and unemployment. All we have in the Plan document, in this connection, are generalities such as: agricultural growth will stimulate industrial growth by raising income levels in the rural sector and thereby the demand for industrial products; increase in employment opportunities and labour absorption in the agricultural sector would be obtained 'through increase in cropping intensity made possible by increased availability of irrigation facilities,' extension of new agricultural technologies to low productivity regions and to small farmers and, 'by the close of this century, the process of transformation implicit in the perspective plan should take agriculture to a level where it will be far more science-based and industry-linked than it is now.'[64] Even these generalities are scattered over different parts of the Plan document and do not form a single unified body of policy measures and action programmes aimed at imparting far greater vigour to agricultural growth than in the past, and reaping the promised results in terms of increased employment opportunities, alleviation of poverty and activation of other sectors of the economy towards faster growth.

To find increased employment opportunities for the rapidly growing labour force in the country, the Plan does look to the agriculture sector for affording a major share of the increase. The target increase in employment over the Plan period is 40.4 million standard person year (SPY). Of this, 17.984 million SPY (or 45 per cent of the total) is envisaged to be in agriculture alone. Against this, manufacturing is shown to provide 6.7 million SPY jobs and the construction industry another 2.2 million.[65] On the face of it, this would suggest acceptance by the planners of the agriculture-based growth-cum-employment development model.

However, once we go behind the total figure of employment under agriculture and look at the broad break-up, the story assumes an altogether different complexion. Of the total of 18 million SPY jobs envisaged to be generated under agriculture, a little under 7 million would be in the crop sector and the rest (11 million) in the non-crop sector. The increase in the crop sector is

to be obtained by the extension of irrigation and the increase in the consumption of fertilisers from the present level of 8 million tonnes a year to 14 million tonnes by the end of the Plan period. This means the entire reliance for the intensification of agriculture is still on the costly and inegalitarian HYV-fertiliser technology. Even the Special Rice Production Programme in eastern India included in the Plan rests on the extension of agricultural technologies responsible for the green revolution in Punjab, Haryana and west U.P. to the eastern states of Bihar, West Bengal, Assam, Orissa and east U.P. This makes the claim sound hollow in the Approach Paper as well as in the final plan document of giving a big push to dryland and rainfed agriculture through the evolution and application of new farm technologies that are appropriate to agriculture on unirrigated lands. This also makes a mockery of the claim that by the close of the century agriculture will become 'far more science-based and industry-linked than it is now'.

In the matter of poverty alleviation also, it is not so much agricultural growth and the development of rural economy that are to be relied upon as the 'contemplated growth pattern and more effective poverty alleviation programmes'. The phrase 'contemplated growth pattern' in the earlier-mentioned statement should not be interpreted too literally. The reduction in the incidence of poverty claimed to have been achieved in the Sixth Plan period was, according to the Planning Commission, the result of 'the process of growth and the anti-poverty programmes'. Further progress in the matter is to be sought along the same lines. There is no mention in the Plan document of making agricultural growth in the low-productivity and poverty-concentration regions of the country the chief instrument of poverty alleviation. The planners do not seem to have any faith in the alternative growth model implied in the 'food, work and productivity' approach to planning suggested in the Approach Paper.

Thus, in spite of the keenly felt need for a change in India's development strategy and expectations raised by the Approach Paper that the overdue change is at least on the cards with effect from the beginning of the Seventh Plan, the desired change in the growth strategy and model has not materialised. In essence, the growth strategy underlying the Seventh Plan is the same as that in the earlier plans. What the plan document ended up with was a facade, rather than reality, of effecting any change of substance in

the basic approach to the development problem of the country and the strategy adopted at the beginning of the Second Plan.

Towards the Eighth Plan

As far as poverty alleviation and the mitigation of unemployment are concerned, the Seventh Plan is going the way of the earlier Plans because it failed to effect the much needed change in the development strategy, although high hopes about this happening had been earlier raised by the Approach Paper. This experience is bound to be repeated in the Eighth Plan unless a serious debate at the expert level is started and a decision taken by the Planning Commission well in advance of the launching of the next plan in 1990 about the basic development strategy that the country should adopt to realise the chief developmental objectives of eliminating poverty and unemployment.

The Commission, on 1 May 1987, issued a note on 'Major Issues Relating to the Eighth Plan'. The note listed the following seven basic objectives to be attained by A.D. 2000: (*i*) to bring down the proportion of population below the poverty line to less than 5 per cent; (*ii*) to attain, for this purpose, near full employment; (*iii*) India should be 'among the major modern industrial nations' with a high degree of technological self-reliance; (*iv*) we should also achieve health for all; (*v*) also, universal elementary education for all children up to the age of 14 should be attained; (*vi*) regional disparities in development should be reduced; and (*vii*) the country must have achieved self-reliance in terms of external economic relations. The immediate source of inspiration for the issue paper was the Budget Speech of the Prime Minister while presenting the 1987–88 Union Budget to Parliament. 'The objective of planning in this country is to build socialism,' he said, 'but this should be the kind of socialism which fits in with our genius but, nevertheless, socialism in its basic meaning of removing disparities and promoting equality of opportunity.' For this purpose, he went on to add,

> we have to grow fast, and we can grow faster only if we use modern technology. This is the only way to deal with the problems of unemployment and poverty.... This then is our

basic strategy—a framework of sustained growth on the basis of rapid modernisation of India's agriculture and industry.

This was the development policy framework, the philosophy of development which was to guide plan formulations in the future. It was left to the Planning Commission to do the actual planning in accordance with this development philosophy stipulation.

There is nothing new in the plan objectives spelt out by the Commission in its 'issue' paper. All these objectives have been there in successive five year plans ever since the beginning of planning in the country. In fact, the perspective twenty-five year plan included in the First Plan document envisaged the achievement of all these objectives by 1975. That we are now fixing A.D. 2000 for the achievement of these very objectives is in itself an admission of the failure of planning in India insofar as the achievement of basic objectives with which planning was started, is concerned. The cause of this failure lies in the development strategy—top priority to investment in heavy industry and the building up of an infrastructural support for industrialisation—underlying planning in the past.

The Commission's note evades this issue altogether. To it, the major macro-level issues that need to be discussed in connection with the formulation of the Eighth Plan are: (*i*) a rise in the growth rate to 6 per cent per annum; (*ii*) an increase in the savings rate and in public sector savings; (*iii*) a reduction in the aggregate capital-output ratio; and (*iv*) making employment a central concern in the Plan. These are 'technocratic' issues which neither require political debate nor decision-making on the part of those wielding power. The essence of the planning exercise lies in taking the available resources as the given base on which the planning body has to build up its development plans with the sole object of realising, to the maximum level possible and in the shortest possible time horizon, the nationally accepted development objectives. The Planning Commission still appears to be shirking the responsibility of doing so. It is not mentally prepared to rethink the development strategy that we have pursued for nearly four decades and its failure to achieve the two basic social objectives of alleviation of poverty and elimination of unemployment. Given the peculiarities of the Indian situation which differs in material respects from that in West Europe in the early nineteenth century

at the start of industrialisation there, this country needs a different type of growth strategy than the one focusing on the output growth rate, savings rate and capital-output ratio. Only a development strategy that would make a reduction in poverty and an increase in employment an integral part of the growth process could meet satisfactorily the needs of the Indian case. This, in turn, would become possible only when planning comes to be based on the massive development of agriculture and the rural economy. An agricultural revolution, not like the green revolution but of a kind that would transform agriculture in unirrigated lands with the help of emerging biotechnologies, must precede the further progress of industrialisation in the country.

The Planning Commission must realise this and, beginning with the Eighth Plan, get out of the rut of the development model that has failed the country in meeting those social goals which formed the *raison d'etre* for launching itself on the course of planned development.

5

Strategy for Agricultural Development

In view of what has been said earlier, reforms of specific sectoral policies in agriculture as well as of development policies as a whole at the macro-level, appear to be long overdue.

Specific Sectoral Policy Reforms

Because of the dominant position that agriculture occupies in the Indian economy as a source of income and employment, the country should now change over to a broad-based 'unimodal' pattern of agricultural development, characterised by gradual but widespread increases in productivity by small farmers adopting technologies appropriate to their labour-abundant, capital-scarce factor endowment situation. Instead of target-oriented production growth, the policy goal henceforth should be to secure the modernisation of agriculture as a whole. The current dualistic or 'bimodal' pattern of agricultural development was adopted under the stress of a grave national food crisis. In the circumstances in which the country was placed in the mid-sixties, the adoption of a biomodal strategy based on the rapid modernisation of a sub-sector of capital-intensive agriculture in areas which, because of the availability of assured supplies of irrigation, offered the prospects of the best and quickest results in food output, was perhaps the wisest thing to do. But once the crisis situation was

over, thoughts should have turned from the immediate problem of getting a given increase in farm output to meet the growing domestic demand for food, to the long-term goal of modernising the farm sector as a whole, covering all geographical regions of the country and all farm sizes. From food self-sufficiency, the attention of policy-makers and planners should have shifted to improving the lot of the small and marginal farmer and landless agricultural labourers, who constitute the core of the rural poor and the unemployed. By the end of 'sixties and early seventies' it had become clear, as evidenced by the launching of special '*garibi hatao*' programmes, that the bimodal strategy of development had failed to produce the 'trickle-down' effect assumed in the Mahalanobis growth model. However, instead of changing the growth strategy from capital-intensive industrialisation (begun with the launching of the Second Five Year Plan) and giving precedence, instead, to agricultural development in planning, the ruling elite started appending populist poverty alleviation programmes to the main plans. In the very nature of things, these programmes could only bring political dividends to the ruling party but not contribute much to the solution of the basic economic problems of poverty and unemployment. As Dantwala has pointed out: 'A direct attack on poverty without an equally direct attack on the structure, which has bred poverty and continues to do so, is an illusion at best, a fraud at worst.'[66]

The authors of the Draft Five Year Plan, 1978–83, were able to perceive this. They thought that if the problems of poverty and unemployment were to be tackled effectively, this was to be made the principal object of planning. The Plan document stated:

> In the next phase of development it will no longer be appropriate in the light of our past experience, to formulate the principal objectives of a particular plan period merely in relation to a specified target of growth for the economy. What matters is not the precise rate of increase in the national product that is achieved in five or ten years, but whether we can ensure within a specified time frame a measurable increase in the welfare of million of the poor.[67]

They went on to suggest that the principal objective of planning should now be defined as achieving, within a period of ten years,

'(*i*) the removal of unemployment and, significantly, under-employment; (*ii*) an appreciable rise in the standard of living of the poorest sections of the population; and (*iii*) provision by the State of some of the basic needs of the people in these income groups.'[68] To achieve these objectives, it was necessary, the planners felt, to give highest priority, to agriculture in planning for 'the employment objective depends crucially on increased labour absorption in agriculture and allied activities.'[69] Considering this, the planners promised that:

> This sector will receive the highest priority, special attention being paid to the uplift of the small and marginal farmer and the landless labourers, especially the scheduled caste and the scheduled tribe families. The strategy for crop production will be to increase the area under irrigation, gross cropped area and the cropping intensity and ensure larger application of inputs. This will be backed by improved agronomic practices for higher efficiency through development and propagation of better seeds, strengthened extension system, assured availability of credit and improved facilities for marketing, storage and processing.[70]

A target of 4 per cent growth rate of agricultural production was fixed, which was to be achieved through the pursuit of appropriate policies relating to land and tenancy reforms, land use and integrated water supply management on a watershed basis, mixed farming for marginal land and a silvi-pastoral approach for areas with low rainfall, increase in the area under cultivation of oilseeds, pulses and cotton, and continuance of the policy of giving price incentives to the farmer. The planners noted that in a vast country like India, with wide differences in agro-climatic conditions from region to region and even from district to district within the same region, there could be no uniform agricultural plan for the country as a whole. It was necessary therefore, that

> detailed agricultural plans... by regions and sub-regions, based on full exploitation of the water resources in command areas of irrigation projects, and on the principle of water conservation and management in the rainfed areas which would enable us to break out of the constricting historical trend rate of growth of around 2 per cent per annum[71]

are drawn up and implemented.

The Draft Plan attempted a welcome break from the past with respect to the policy towards agriculture but not that of policy on agriculture. The Plan accorded the highest priority to agriculture in the allocation of Plan outlays in the public sector. It also affirmed the view that the achievement of employment objective depends crucially on increased labour absorption in agriculture and allied activities. But having stated this, the Plan did not pursue the matter to its logical conclusion of building the whole development process of the economy around growth of the agricultural sector. There was no attempt on the part of the planners to give up the 'bimodal' strategy of the earlier plans and adopt the 'unimodal' strategy of development based on agricultural growth. The development of agriculture, in their scheme of things, was an instrument for increased labour absorption to mitigate the incidence of rural unemployment, and not a catalyst for growth of the economy starting from below at the level of small and marginal farmer and going up to heavy and high technology use industry.

The growth model used by the planners was no different from that of the earlier plans. They themselves admitted this. The Plan document stated: 'The quantitative framework upon which this plan is based is a consistency model, i.e., a description of the economy in terms of a set of relationships between different sectors, between income and consumption, between production and employment, etc. Such models have also been the basis of earlier plans.'[72] Where then did the difference between this and earlier plans lie? The answer given was: 'The special features of the present planning model are related to the proposed objectives and development strategy. In building the model, particular attention was paid to the analysis of production possibilities and input requirements in agriculture.'[73] This, however, amounts to making a distinction without a difference. Agricultural production targets in every plan have always been worked out on the basis of the projected increase, during the Plan period, in irrigation potential, increase in the consumption of chemical fertilisers and extension of the area under high-yielding varieties of seeds. Doing the same thing more elaborately or in much greater detail did not make the Draft Plan different from the earlier five year plans, its stress on agricultural development notwithstanding. In any case, the Plan

proved a short-lived affair and with the Sixth Plan 1980–85 that followed, the country reverted to the old model of planning. A beginning with the unimodal development strategy in the country's planning remains to be made.

Within the agricultural sector also, the 'dualism' that has characterised the development of the sector, especially since the mid-sixties, has to be dropped and the total development of the agricultural economy all along the line at varying size levels of holdings and conditions of crop production has to be sought. Target-oriented growth has resulted in the development of highly capital-intensive farming, that produced all the needed marketable surplus of food in a limited, highly irrigated region of the country, on the one hand, and the continuance of traditional, low productivity labour-intensive cultivation in the rainfed areas, on the other. The 'trickle-down' effect of the green revolution from the three states of the north to the rest of India has not materialised. Indian agriculture remains divided into a prosperous capitalistic sector (comprising 30 per cent of the area under irrigation that produces 58 per cent of the agricultural output) and the poor, backward, low productivity sector (comprising 70 per cent of the total cultivated area and accounting for 42 per cent of the total agricultural produce in the country). This dichotomous division in the agricultural growth profile of the country has to end. Agriculture in the rainfed and arid parts of the country, which had in the past suffered neglect, has to be given greater attention for improving productivity and enabling those areas to catch up with agriculture in irrigated areas in the use of modern inputs and farming practices. The policy implications of effecting this change in the agricultural growth pattern are the following.

1. An all-out effort by the agricultural scientists should be made to evolve high-yield varieties of seeds of crops grown in the rainfed, semi-arid and dry regions of the country. R&D efforts should be intensified to evolve farming technologies that would increase yields and minimise the risk to farmers in those regions.

2. Small and marginal farmers should receive special attention in the supply of farm inputs. The special programmes under the Centrally Sponsored Scheme of Assistance to Small and Marginal Farmers launched in 1983–84 should be pursued vigorously, extended and further strengthened. The Union Agriculture

Ministry Annual Report for 1984–85 showed that the scheme had yet not caught on. The outlay sanctioned originally for the scheme for 1983–84 was Rs. 250 crore, of which Rs. 125 crore was to be the share of the Union and the rest (Rs. 125 crore) that of the state governments. The outlay of the Central government had to be revised downward to Rs. 85 crore because of the lack of sufficient enthusiasm shown by the state governments for the scheme. For 1984–85, the outlay earmarked for the purpose was Rs. 100 crore. In the Seventh Plan, provision has been made to give financial assistance of Rs. 5 lakh to every development block in the country under this scheme.

Under the scheme, small and marginal farmers are helped in the provision of irrigation facilities (construction, improvement and maintenance of minor irrigation works) and the supply of inputs (like improved seeds and fertilisers).

An extensive programme of free distribution of mini-kits of seeds and fertilisers for the production of oilseeds and pulses has been in operation under the scheme, which is intended to cover all the 5,600 blocks in the country. The total number of mini-kits of seeds and fertilisers distributed in 1984–85 till the end of December 1984 was 2.93 million and in 1985–86, 3.93 million. For 1986–87, however, the anticipated figure was only a little over 2 million, which means a sharp decline in the enthusiasm for the programme on the part of the government. Considering the fact that 73 per cent of the total land holdings in the country come under the category of holdings of small and marginal farmers, the total distribution of mini-kits (even at the peak 1985–86 level) was woefully inadequate to make any perceptible impact on the production of oilseeds and pulses or on improving the lot of the small and marginal farmers. The scheme is, at present, confined to encouraging the production of oilseeds and pulses under the new 20-Point Programme. It should be made general and extended to cover cereal crops as well. Besides, the present purpose of the scheme of free distribution of seed and fertiliser mini-kits is to 'increase the production of pulses and oilseeds.' The purpose should be redefined to make the programme an instrument to increase the income and production levels of the small and marginal farmer as well as to increase food production by him for his own domestic consumption. This could be done by making the

programme of free distribution of mini-kits of fertiliser and seeds a part of the Integrated Rural Development Programme (IRDP).

Under other headings, the Small and Marginal Farmers Programme has, for the present, little to show by way of achievement. This is clear from the fact that apart from the laconic statement 'the scheme has already made a great impact,' the annual report of the Agriculture Department for 1985–86 has nothing to report by way of achievement under the scheme.

3. The entire scheme with the various other programmes, besides the free distribution of mini-kits of seed and fertiliser, under it, should be made an integral part of the IRDP. The IRDP itself needs to be turned into a production programme of the poor instead of a poverty alleviation programme through the distribution of grants and loans to selected families in each block, as is the case at present. The focus of the programme should be to help the small and marginal farmer to get more from his tiny or small plot of land by increasing crop production on it and to earn more by engaging himself in mixed farming.

4. The subsidy on fertilisers paid from the Central exchequer and on irrigation water supplied from the major and medium surface irrigation works and on electricity supplied for running pumpsets paid from the exchequers of the state governments should be replaced by subsidisation of the supply of needed inputs only to the small and marginal farmers and providing financial support for the construction of minor irrigation works, and water-conservation measures in the dry and arid regions.

The whole philosophy of promotion and subsidisation of agricultural growth from the public funds has to change. The developed part of agriculture should be left to its own resources for development. Attention should turn entirely to the growth of agriculture in the rainfed, dry and arid areas, on the one hand, and helping the small and marginal farmers to become self-supporting in the long run, on the other. Public outlays in the agricultural sector should now be devoted exclusively to building an infrastructure in the backward agricultural regions to increase agricultural productivity and crop yields there, and to supporting farming operations of the weaker sections of the farming community.

5. The food policy of the country since the mid-sixties has

caused and is primarily responsible for the division of Indian agriculture into two mutually exclusive segments of surplus production and supply deficit. The former has come to support the latter in the matter of food supply through the public distribution system. Procurement of the needed supplies for the system is made mostly from the surplus areas. Procurement and support prices are accordingly set with a view to getting sufficient procurement to meet the requirements of the public distribution system. A mutually supporting system of procurement and production of food surpluses has, thus, come to be built in the country. This system prevents agriculture in the deficit areas to grow or its growth potential to be fully realised. This may be the most opportune time to have a fresh look at the desirability of continuing with the public distribution of foodgrains in its present form, as it is becoming untenable on account of the inner contradictions the system has developed. The government itself seems to be anxious to review 'the policies and programmes (in the food sector) which we have been following for long' as the then Minister for Food and Civil Supplies, Rao Birendra Singh, declared at a seminar on Food Security in Asia held in April 1985 in Delhi. The Minister said: 'The time is now opportune to consider basic questions relating to the optimum stock levels for security, the direction of public distribution system, commodity composition in distribution including coarse grains, pricing policies, subsidy levels.'[73] Advantage should have been taken of this conclusion at the highest policy-making level and action initiated to reform the public distribution system in two directions: (*i*) the government should stop procuring foodgrains at stipulated prices to run the public distribution system in a generalised form that caters mostly to the needs of the urban population, and (*ii*) the system, if it is to be continued, should make available subsidised supplies of food to the poor only by fixing a certain income ceiling for a household to become eligible to draw ration from public distribution outlets. All those above the ceiling should be made to buy their supplies from the open market at prevailing prices. This reform, besides affecting the economy in public expenditure (as a much less amount of food subsidy would be required to be paid when the public distribution of foodgrains is restricted to the poor only), will have three other important benefits: (*i*) it will end the artificial division of the country into areas of

progressive farming and those of backward agriculture. It is the public distribution system, and the procurement compulsions that go with it, which originally brought about and has since continued to prop up that division; (*ii*) the withdrawal of government, as the main purchaser of all the marketed surplus, will put agriculture in the green revolution region on a competitive basis, add to its efficiency and improve its performance. Once the monopsonic hold of the government on agriculture in the relatively advanced areas is put to an end, market forces will begin to assert themselves. This would not only result in a reduction of the unit cost of production in the long-run and thereby cheapen the food supply in the domestic market but also create an efficient, internationally competitive export sector of foodgrains in Indian agriculture; (*iii*) it will help in pulling out farming in the rainfed, dry and arid regions, from its present stagnation, promote the production of coarse grains and pulses which are traditional crops of these areas, and improve the income and purchasing power of the farmers, especially the small and marginal farmers, there. This will have the effect of reducing regional disparities in agricultural growth and incomes.

6. A basic change in the agricultural price policy is needed. The present policy which pays lip service to providing remunerative prices to the farmer and, at the same time protecting the interests of consumers, has in practice reduced itself to serving the interests of a particular section of farmers, namely, those in the surplus production areas, and the consumer in the urban areas, mostly belonging to vocal and politically powerful middle and upper middle classes. In the past, the procurement prices were fixed at a uniform rate with an eye on the unstated object of getting sufficient procurement to run the public distribution system. This necessity is now gone since sufficient procurement is no more a problem. However, there is now another development. Of late, pressure from the politically powerful farmer lobby that has emerged in the northern and western regions of the country has started exerting its influence on the pricing of foodgrains and some commercial crops by the government.

This gives a new dimension to policy-making on agricultural prices. If the present system of ad hocism in fixing crop prices from year to year depending not so much on the merit of the case in

economic terms as on the political pressure that an interest group of farmers may be able to bring to bear upon the policy-makers in respect of a crop in a particular year is allowed to continue, we are going to face ever-growing distortions in the cropping pattern and far more demand-supply imbalances in individual crops as time goes on. The recent decision to add to the Agricultural Prices and Costs Commission three more members who would look after the agriculturists' interests, is a pointer to what is going to happen to agricultural price policy—and through it to the planning of crop production—if steps are not taken immediately to put this policy on a rational and scientific footing. Indeed, it can be argued that a swing in the price policy, in favour of producers, from the consumer-biased policy followed so far would only mean doing belated justice to the former. But that will be going to the other extreme, and that too at a heavy cost to the nation in terms of producing below the optimal level and a waste of productive resources. There can be no two opinions about the need to ensure that the farmer gets remunerative prices: the high rate of agricultural growth desired to be achieved would not be possible without that. But to have a favourable price policy at the sectoral level as a whole is one thing; to fix high prices in respect of inividual crops in response to political pressure exercised on their respective behalf, is quite another. The former type of policy must be seen as a tonic for the healthy growth of the sector; the latter as a distorter of growth and, therefore, inimical to the long-term interests of the sector and the nation. The present policy serves the short-term political interests of the ruling elite but is inimical to the long-term interests of agricultural growth in the country. It is a short-sighted policy which has already done immense harm to agricultural growth, distorted the cropping pattern and produced regional and crop pattern imbalances throughout. India needs a positive agricultural price policy that would promote the balanced growth of agriculture in all parts of the country and of the various crops. This could be achieved through a policy that favours the produetion of crops that are normally raised on rainfed, dry and arid lands.

The object of the future agricultural price policy should be twofold: (*i*) to provide sufficient incentive to the farmer to optimise his production by putting the resources of land, water, labour

and various other inputs at his command to fullest use; and (*ii*) within the overall framework of a growth-oriented price policy, special attention should be paid to the promotion of the growth of those crops and such areas that have been left behind in the surge in crop yields and the use of new farm technology because of the existing price structure having been unfavourable to such growth.

7. A special effort at providing a technological thrust for growth in the rainfed and dry farming areas is needed. The seed-fertiliser revolution has largely bypassed agriculture in these areas, with the result that farming there still continues to be of the traditional kind and largely of a subsistence nature. New high-yielding varieties of seeds of the crops grown in these areas, especially millet, pulses, and oilseeds, remain to be evolved. The problems of dryland farming with respect to water conservation/harvesting technology need to be given a closer look than in the past.

In short, the development strategy in agriculture for the next fifteen years (beginning with the Eighth Plan) should be oriented towards greatly narrowing, if not altogether closing, the development level gaps crop-wise and region-wise that have emerged in the country. The major task for agricultural policy over this period should be the reduction of inequality by concentrating development efforts on selected target groups (namely, small and marginal farmers) and on agriculturally backward areas. Instead of a generalised approach, the strategy for agricultural growth and an increase in crop production should now become area, crop and target group specific. The Planning Commission has long been thinking in terms of having district level planning for agricultural growth and crop production. This is a long overdue move that needs to be implemented forthwith. This would make growth, and with it plan resource allocation, area and crop specific.

Closely connected with it is the suggestion that various special programmes related to agricultural and rural development and poverty alleviation are combined into a single comprehensive programme for the development of agriculture in the agriculturally backward areas and the improvement of income levels of the poor in those areas. Thus, the Special Rice Production Programme formulated for the eastern states of Assam, Bihar, Orissa, West Bengal and eastern U.P.; the centrally sponsored schemes on pulses and oilseeds development; the Dryland Farming Programme; the centrally sponsored programme for Assisting the

Small and Marginal Farmers; Social and Farm Forestry Programme; the poverty alleviation Integrated Rural Development Programme; and a host of other similar schemes should be merged into a single comprehensive area and crop specific programme for district-wise agricultural and rural development aiming at the fullest utilisation of the available resources of land, water and labour in crop production and allied agricultural activities. This will make for efficiency in the administration of development programmes; economise development expenditure by reducing wastage that results from a multiplicity of departments and agencies working towards the same end; increase the effectiveness of Plan and development efforts aimed at the increase of agricultural productivity, the creation of more employment and reduction in the incidence of poverty; and, provide cohesiveness to the whole approach to agricultural and rural development, on the one hand, and the alleviation of poverty and unemployment, on the other. Low productivity agriculture and endemic rural poverty are two sides of the same coin. What is needed to solve these problems is a holistic rather than a compartmentalised approach to agricultural development.

A change in the development strategy of the country is long overdue. The 'bimodal' development strategy has given an annual 3.6 per cent GDP growth rate and increased food production to make the country self-sufficient in food supply. However, it has failed to make any impression on the endemic problems of malnutrition, unemployment, low productivity and poverty which continue to confront the country with practically the same intensity today as at the time of Independence. It is increasingly becoming clear now that the growth strategy adopted from the beginning of the Second Plan was not suitable to the Indian situation and that, if the basic economic problems of the country are to be solved, a new strategy should be evolved to take its place. The focus in the new strategy should be on the three major objectives of food, employment and productivity enunciated by the late Prime Minister, Indira Gandhi. The strategy should combine growth with a reduction in malnutrition, unemployment and other manifestations of poverty. This would obviate the need for running poverty alleviation programmes separately from the growth process. It would seek to mobilise idle manpower for the production of food, thereby increasing incomes, purchasing power

and, therefore, the demand for food on the part of the poor, on the one hand, and the supply of food through its increased production at the base level, on the other. At the centre of the development strategy will be the food supply-demand equation set in a dynamic context, with a focus on the level and productivity of investment in food production and on the mobilisation of labour in productive employment. The view that in predominantly agricultural countries like India, a high level equilibrium of food production and employment is not only desirable on social welfare and equity grounds but it also represents a strategy capable of achieving faster overall growth of the economy,[75] has begun to get wide credence. But this remains at the conceptual stage and a well articulated model of development, with agricultural growth as the fountainhead of all development, is yet to be evolved. In Indian planning, following the Harrod-Domar and Fel'dman–Mahalanobis models, economic growth continues to be treated as a function of the rate of capital accumulation and investment in the economy. In contrast, the Indian situation demands—and this applies to all large developing agrarian economies with a predominance of agriculture as a contributor to the national income and employment source for a large majority of the labour force and with a significant proportion of the population suffering from poverty and undernourishment—that the dynamics of growth is provided by steadily rising levels of food consumption and food production at the base. Reduction of malnutrition and related manifestations of poverty in an economy like that of India, as Mellor and Johnston rightly point out,

> requires a set of interacting forces that link nutritional need, generation of effective demand for food on the part of the poor, and increased employment, a strategy of development that structures demand towards food and services that have a high employment content, production of wage goods and an emphasis on growth in agriculture.[76]

The increase in employment through such growth dynamics will not remain confined to the agricultural sector alone. The unimodal pattern of growth starting from agriculture will have a multiplier effect through forward and backward linkages with non-farm sectors of the economy. Further, the increase in rural incomes

generated by increased agricultural production and employment would foster the more rapid growth of output and employment in manufacturing and other non-farm sectors. The total increase in employment under the unimodal pattern of growth is likely to far exceed the increase under the bimodal pattern, with the same rate of growth in the two cases. An unpublished Ph.D thesis from Delhi University estimates that a 5 per cent rate of growth of agricultural output would lead to an additional employment equivalent to 5 million person-years in the agricultural sector itself.

> In addition, agricultural growth as compared to industrial growth has a large indirect effect on employment as 1 per cent growth in agricultural output causes 1.29 per cent increase in employment in the manufacturing sector and 1 per cent in the tertiary sector.... 5 per cent growth in agricultural output would lead to the increase in employment for 4.58 million person in both the manufacturing and tertiary sectors, or a total increase of 9.58 million jobs in all the three sectors.[77]

This conclusion should be taken as illustrative of the positive effect on employment of growth in agriculture in the Indian situation rather than as an exact measure of the magnitude of that effect. For one thing, the sample taken by the author comprising nine districts—Ferozepur (Punjab), Muzaffarnagar (U.P.), Thanjavur (Tamil Nadu) and six districts in West Bengal (namely, 24 Parganas, Nadia, Murshidabad, Hooghly, Burdwan and Birbhum)—is too small and unrepresentative of the agricultural sector of the country as whole. For another, the methodology used to work out the effect, on employment in the farm and non-farm sectors, of the growth of agricultural output is too simplistic to serve as a guide for the exact measurement of that effect. But the policy conclusion reached by the author that, on considerations of employment creation and poverty mitigation, 'agriculture ought to be assigned a high priority in the strategy of development to be pursued in India,' is valid. In fact if agricultural growth is led by a demand drive at the level of the rural poor (comprising small and marginal farmers and landless labourers), the employment creating potential of such growth is likely to be far greater than envisaged in the research study under reference. As Mellor has

pertinently pointed out, in such a situation 'agriculture may provide a demand drive for development similar to that often depicted for foreign markets in export-led growth.'[78]

Decentralised Planning

In the earlier stages, a five year plan based on agricultural growth at the Centre cannot, by its very nature, be as sophisticated as one based on the savings-investments balance and inter-sectoral input-output tables. A lot of preparatory work in data collection from the village level upward will have to be done before a detailed five year plan with agricultural growth and the dynamics of the food demand-supply equation as its bases, can be worked out. At least three types of statistical data would be needed for purposes of sound policy analysis and working out inter-sectoral linkages and growth targets. These are: (*a*) the distribution of income by factor shares and from that to inter-personal distribution of income; (*b*) the expenditure patterns of various income groups; and (*c*) the production characteristics of the sectors on which additional income is expended. On the basis of this data, linkages between agricultural and industrial growth will have to be worked out and plan allocations made accordingly. The guiding policy objectives will be to optimise employment and incomes of the poor and reduce gradually the wide income disparities existing between the modern, which includes large-scale industry, advanced segment of agriculture and the tertiary sector, and, the traditional part of the economy (comprising traditional agriculture, rural industry and other unorganised economic activity in the rural areas). This pattern of growth will be far less capital-intensive and, therefore, far more efficient in terms of output and employment growth in the existing circumstances. The composition of industrial production would change in favour of the production of goods of mass consumption. The appreciable lowering of the capital-output ratio in the economy expected from the change in the growth pattern would release a considerable portion of the public sector plan outlay from the manufacturing, mining, transport and construction sectors for deployment elsewhere. This could be used for the development of a rural infrastructure, roads, electricity, schools, market places, and so on

The Central Plan will, under the new strategy, become an indicative plan and be of a much smaller size than at present. Detailed planning will pass on to the district level. Each district will have its own planning machinery, which will draw up the district development plan, keeping in view its resources, immediate and long-term needs and development potential. The district plan will be drawn up within the broad framework of the stated policies and priorities of the Central and state plans but detailed development and input-output planning will have to be done by the district itself. The state plan will coordinate the district plans, provide the unifying link between them, and present a consolidated picture of the development effort envisaged in the time-frame of the five year national plan for the state as a whole. The Central Plan, likewise, will coordinate the state plans, provide the unifying link between them and consolidate them into a unified national plan.

The whole set up of the district administration will have to be radically changed. The District Collector or Deputy Commissioner will, under the new dispensation, become Development Commissioner of the district assuming overall charge of development administration—in place of being responsible for the maintenance of law and order and the collection of land revenue, which is the case at present. While it should be ideal for every district to have its own government responsible both for development and the civil administration of the district with the District Magistrate or Collector assuming the role of Chief Secretary in that government, on political grounds it does not seem to be a practical proposition in the near future. The recently launched Karnataka experiment in district government will be watched with keen interest by the rest of the country. In other states, it will be enough for the present if a District Development Council with representatives of the people on it as members could be created and given charge of formulating and implementing the district plan. This should be a statutory and not an informal or advisory body.

Decentralised planning along these lines is a necessary part of planning based on an employment-cum-agricultural growth oriented strategy of economic development. Conditions of agricultural production—soil properties and availability of water resources for irrigation, agro-climatic conditions and cropping pattern, distribution of land and social composition of the farming community—differ from district to district and even within different

parts of the same district. An agriculture-based growth strategy, therefore, becomes incompatible with a centralised system of planning. In the new set up, the Central plan would operate at the macro-level and comprehend the growth of the gross domestic product, fiscal and monetary policies, prices and price structure, external trade and foreign exchange, science and technology, national transport and communication systems, and the conduct of the country's economic relations with other nations. The corporate industrial sector will also remain part of the Central plan while medium and small-scale industry will go to the state plans' sphere and rural industry to the district plan. Division of financial resources between the Centre, states and district plan authorities will be made in accordance with the respective responsibilities assigned to them in the planned economic growth of the country. The present state of dependency of the states on the Centre for funding of development projects and programmes will cease and the two will be assigned their respective independent sources of revenue and income. Grants-in-aid from the Centre to the state and from the states to the districts will be only supplementary in nature and not the primary source of finance for the district and state bodies. For the most part, these bodies will be respectively responsible for raising their own resources. Grants will be based on the poverty and backwardness index. The object of grants would be to reduce inter-regional disparities in development and income levels of the people by helping the weaker sections to catch up with the stronger.

One objection to the suggested strategy and pattern of growth could be that it runs counter to the Prime Minister's oft-declared intention of carrying out modernisation of the economy and forging technological advance all along the line. This is not so. On the contrary, what is being proposed is rapid modernisation of the traditional segment of agriculture that has been left behind in the race for modernisation and technological advance. In fact, technological advance is central to any growth strategy based on agricultural development. It is the reliance on net product-increasing technology rather than on larger capital investments to get an increased annual national product that distinguishes it from and marks the superiority of the recommended growth strategy over the alternative growth models that make growth entirely a function of the rate of capital accumulation and investments.

Adoption of this strategy for growth over the next fifteen-year period would, thus, not only be consistent with the Prime Minister's ideas of technological advance of the country when it enters the twenty-first century, but would also impart a practical content and significance to those ideas.

Macro-Level Development Policies: Fiscal, Monetary and Trade

State in Relation to Agriculture: Historical Perspective

A corollary to change in the development strategy is the reorientation of macro-economic policies in a way that they no longer discriminate against agriculture. Instead of hindering agricultural development, which has often been the case in the past, the economy-wide policies should be so formulated that they do not directly or indirectly depress profitability in agriculture. It is necessary to ensure that the outflow of investment resources from agriculture to other sectors of the economy is prevented and, instead, capital accumulation in agriculture is promoted through deliberate policy measures.

A key objective of macro-level economic policies has to be to secure the rising trend of farm incomes in real terms. This is possible only if in a period of inflation brought about either by deficit financing of public expenditure at home or by developments in the international economy, farm prices are not artificially depressed through control measures in the name of containing inflation and securing price stability. On the other hand, if on account of technological improvements, the unit costs of agricultural produce begin showing a falling trend, the advantage of that development should be allowed to be shared by other sectors of the economy but prices should not be allowed to fall so low that the farmer is completely deprived of productivity gains in the sector. This means that market forces are allowed to operate freely in the pricing and marketing of agricultural produce, except in situations where market intervention by the state is indicated in the interests of protecting farm incomes against erosion caused by factors beyond the farmer's control. This intervention is needed as much in the interest of the farming community as of the economy

as a whole. A precipitate fall in agricultural incomes would reduce the effective demand for industrial goods and services used by the agriculturists, and thereby cause depression in the non-farm sectors of the economy as well. A major example in history of this type of market intervention by the state is President Roosevelt's New Deal in the U.S. introduced in the early thirties to save the agriculturists from ruin during the Great Depression. The present-day farm-income support policies being pursued in the U.S. and the EEC group of countries, of course, belong to an altogether different category.

Protection of domestic agriculture against foreign competition, however, goes back in history much longer. Governments have protected farmers for centuries. Since the beginning of industrialisation, there has been only one interlude of free-trade in agriculture in Europe. It began with the abolition of the Corn Laws by the United Kingdom in 1846 and, by 1860, had spread throughout most of western Europe. But free-trade lasted less than two decades. During the next fifty years only Denmark, the Netherlands and the United Kingdom resisted the drift back to protectionism that culminated in the high tariff levels imposed during the Great Depression.

It was during the Depression that agricultural protectionism touched its peak. The tariff rates imposed during the Depression scaled new heights. In Germany, for instance, the import duty on foodstuffs (which was 21.8 per cent ad valorem in 1913 and 27.4 per cent in 1927) shot up to 82.5 per cent in 1931. In France, the increase in duty was from 19.1 per cent in 1927 to 53 per cent in 1931, and in Italy it rose from 24.5 per cent to 66 per cent during the same period. In Finland the rate of duty on foodstuffs stood at 102 per cent, in Bulgaria 133 per cent and in Poland 110 per cent in 1931. Invariably, the rates of protection duty on foodstuffs were far higher than those on semi-manufactured and factory manufactured goods in all the European countries. This means that agricultural protection received greater attention from the governments than industrial protection.

In Asia, Japan has practically the same story to tell with respect to agricultural protectionism. In 1904 Japan imposed tariff restrictions on rice imports. Deliberate policy action was taken in the 1920s and 1930s to keep the domestic price of foodstuffs higher than the international price in order to encourage the achievement

of national self-sufficiency in food supply. A measure of the degree of protection afforded to the domestic producer is the difference in rice prices between Japan and Thailand. In the 1920s the price in Japan was three times higher than in Thailand. This is too great a gap to be explained by the quality difference between the rice of the two countries. The level of protection in Japan in the late 1950s was over 40 per cent. This rose to 76 per cent by 1965. In Korea, the domestic producer prices exceeded the border prices by 166 per cent between 1980 and 1982.[79]

Policy in India: This historical evidence amply proves that a prosperous agricultural base is a precondition for industrial growth in an economy and that agricultural incomes are to be protected against erosion when threatened by cheaper imports of farm produce from abroad. The evidence runs counter to the view that growth in a developing country means industrialisation, which has to be at the cost of agriculture. All our macro-economic policies in the past have been guided by that view. Instead of protecting agriculture against income losses from adverse economic policies, we have deliberately pursued policies causing a drain of incomes and wealth from the agricultural sector.

A recent study by Swami and Gulati has shown that, over the 1970s decade, Indian farmers in twelve selected states suffered a cumulative collective loss of Rs. 45,000 crore at current prices (or Rs. 12,479.89 crore at constant 1970–71 prices) relative to their 1971–72 level of incomes.[80] According to their estimates, Gujarat was the leading sufferer in the twelve states, its loss in terms of constant (1971–72 level) prices being Rs. 3,404.45 crore, while Tamil Nadu was the lone state in the country showing a net gain in agricultural incomes during the period (amounting to Rs. 846.67 crore).[81] Table 5.1 sums up the results of their study.

The data is for twelve states only. Among the major states, data is missing for Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala and Rajasthan. If these and other states and Union Territories, which have been left out of the calculation by the authors because of the absence of adequate data, were included, the wealth drain from the farm to the non-farm sectors would work out to be at least 50 per cent more than the computed figure (which means a total of Rs. 18,720 crore at 1970–71 prices). This is practically equal to the gross domestic product at the factor cost of the

Table 5.1
Collective Loss of Cultivators in Selected States (at 1970–71 prices)

State	*Cumulative Loss (−) in Ten Years Relative to 1971–72 Level (Rs. Crore)*
Andhra Pradesh	− 1,646.14
Assam	− 212.76
Bihar	− 1,334.17
Gujarat	− 3,404.45
Haryana	− 854.73
Madhya Pradesh	− 1,104.22
Maharashtra	− 211.83
Orissa	− 524.27
Punjab	− 381.75
Tamil Nadu	+ 846.67
Uttar Pradesh	− 3,142.11
West Bengal	− 510.13
Total	−12,479.89

agricultural sector of Rs. 18,774 crore in 1979–80 at constant (1970–71) prices. In other words, the farm sector, because of adverse price trends set by the government policy on administered prices, was losing more than 10 per cent of its annual income to other sectors of the economy during the 1970s. This is in spite of subsidisation of farm inputs by the government which rose, according to one estimate, from Rs. 66 crore in 1970–71 to Rs. 1,312 crore in 1980–81. To this may be added other benefits like exemption of agricultural incomes from income tax and the levy of almost nominal rates of land tax (i.e., land revenue) and concessional interest rates to the farmers on bank credit. The material benefits in the form of subsidies and various concessions that the farmer got from the public exchequer failed to compensate him fully for the indirect taxation to which he was subjected. The result was that there was a continuous and significant amount of transfer of incomes from the agriculture to other sectors of the economy, even in the post-green revolution period, which is generally considered to be a period of agricultural prosperity in the country. The case of Punjab and Haryana—the two leading states in the green revolution and the principal growers of wheat in the country—tellingly illustrates this point. According to the two

authors, the per hectare income of land under wheat cultivation in Punjab declined from Rs. 328 in 1970–71 to Rs. 193 in 1978–79, while in Haryana the corresponding figures were Rs. 611 and Rs. −46. One cannot be too sure about the negative figure of Rs. 46 in the case of Haryana for 1978–79. There might be some computational error. But that is a different matter altogether. What we are concerned with here is the declining trend of income per hectare from the cultivation of wheat over the period in the two states, which is unmistakable.

The principal source of erosion of farmers' incomes and transfer of resources from the agricultural sector is the fiscal and monetary policies followed to finance the plan expenditure. Financing of five year plans invariably involved some amount of deficit financing and an increase in money supply which was not matched by an equivalent rate of GDP growth. This generated inflationary pressures in the economy which were sought to be curbed by the exercise of administrative controls over the prices of consumer goods, especially food articles like foodgrains, sugar and edible oils. Inflation, in itself, means indirect taxation of the people. This taxation is of a very regressive nature for it falls more heavily on the poor than on the rich. In the case of India, the regressive effects of inflation were compounded by the government deliberately attempting to curb the rise in prices of agricultural commodities and agro-based manufactures. The agriculturist was prevented from protecting himself against the adverse effect of inflation on his income by government intervention, on behalf of the consumer, in the market for agricultural produce.

The professed aim of the policy was to control inflation, which was wrongly attributed to the existence of shortages of essential consumer goods in the economy. The real source of inflation lay in the heavy doses of deficit financing administered to the economy by the government to finance its unproductive expenditure. Commodity shortages were more often the product and not the cause of inflation. But in the debate on prices and price stabilisation measures in the country, the effect was often confused with the cause which, in turn, led to wrong policy conclusions and prescriptions. For many years the government was allowed to get away with its inflationary finance policy in the belief (which was sedulously created by the official machinery) that a certain measure of deficit financing in a developing economy was not only

necessary but even desirable in the interest of planned development and the growth of the economy. The process has continued for such a long time that deficit financing has got institutionalised into being a part of the planning process and has become a permanent feature of the Union government's annual budget. Today, what is discussed is not the evil consequences of deficit financing but its supposed 'safe limits'—as if there were safe limits to indulgence in something which is known to be a serious health hazard. Resources raised through deficit financing do not fall from heaven. They are a form of indirect taxation of one section of the society or other. In the Indian case, the sector that bears the brunt of this taxation is agriculture and the poorer sections of the agricultural population, the cultivator and landless labourer. Inflation was used as an instrument to exact a tribute from the peripheral agricultural and rural sectors for the promotion and growth of the metropolitan centre, comprising public sector industrial enterprises and the supporting urban infrastructure. The macro-economic policies were designed to tax agriculture for obtaining resources for the development of industry through this indirect taxation which was continuous and, of course, invisible. But that did not make it less real and pernicious in its consequences.

International trade policies pursued by the country with respect to agricultural produce were similar in design and effect. In the industrial field, an important element in our development policy was to set up those industries that would provide import substitution.

In the case of agriculture, it was the other way round. Under the belief that India, for many years to come, was bound to remain deficient in food supply, not only was a free-trade policy in foodgrains imports adopted from the very beginning but concessional imports were even encouraged from almost the start of the planning era. The Indian farmers conclusively demonstrated during the First Five Year Plan that given a little encouragement, they could produce all the food the country needed and even more. By 1954–55, the country had become not only self-sufficient in foodgrain supply but had some surplus to accumulate which could be kept aside for a 'rainy day'. Food controls were withdrawn and prices fell so low that the government had to come out with price support measures to prevent a further downward slide in cereal prices. But the offer of concessional supplies under PL

480 from the U.S. in 1955, which culminated in the signing of the first PL 480 agreement in April the following year, proved so tempting to our planners and policy-makers that they accepted the offer with alacrity. Not the least thought was given to the interests of the Indian farmers or to the effect that cheap imports would have on the growth of agriculture in this country. Domestic production of wheat and other grains in the country were depressed by the PL 480 imports.[82] The country was rendered permanently short in food supply. It was made dependent on imports till the U.S. in August 1965, when the existing agreement expired, refused to sign another long-term aid agreement and adopted a 'short-tether' policy of doling out to this country stocks sufficient to meet a few months' requirements at a time, and explicitly tying the aid to India to the adoption of policies by India aimed at increasing domestic agricultural production and curbing population growth. The green revolution followed in the wake of the policy challenge posed to the government by the action of President Johnson's administration.

Since the early seventies, concessional imports of foodgrains to the country have practically stopped and Indian agriculture has been spared the disincentive to the growth of production that those imports constituted. However, the government has a monopoly of foreign trade in foodgrains and imports are undertaken only in the event of a perceived need for supplies by the government to replenish the public sector buffer stocks for running the public distribution system. There are no custom duties imposed on the import of foodgrains. The object of the policy is price stabilisation at, in practice, levels which are below the border price of imports. Together with the public distribution system, of which it has come to be used as a supportive adjunct, the foreign trade policy in foodgrains has throughout the post-green revolution period worked as a depressive influence on the price of foodgrains in the domestic market and, therefore, against the interest of the agricultural sector.

Apart from the cost of maintaining buffer stocks and the inefficiencies of the public sector handling of marketing operations (compared to private trade) which the nation has to bear, the agricultural sector is also called upon to bear the heavy cost of restrictions imposed by the government assuming monopolistic control of import trade and the domestic marketing of foodgrains.

An important consideration with the Agricultural Prices Commission (APC) in setting the procurement price of cereals in the early years of the green revolution was providing curbs on inflation through the manipulation of food prices. The APC wrote in its Report on Rabi Cereals for 1967–68:

> In an inflationary situation an increase in procurement prices has the effect of pushing up the market prices.... Competitive pressures for increase in procurement prices thus tend to generate a vicious circle without helping actual procurement. The rise in foodgrains prices has been the single most important element in stoking the fires of inflation.

Pressed by the deteriorating food situation and the need for increased domestic procurement, the government had allowed a slightly higher procurement price for wheat in 1973–74 than what was recommended by the APC. The Commission in its Report on Price Policy for Kharif Cereals for the year 1974–75 reacted sharply to the government action and warned that if the demands of the farmers for higher procurement prices were accepted

> the contribution of the implied increase of 85 per cent in the procurement price of paddy—from Rs. 54 to Rs. 100—within a span of 24 months in feeding the fires of inflation can well be imagined. Inflation indeed is eroding the very discipline in the system which is so indispensable for managing it.

The following year, the Commission went on record to say that its primary consideration in setting agricultural prices was the control of inflationary pressures in the economy rather than giving a fair deal to the farmers, or even providing incentives for an increase in the domestic production of foodgrains. In the Report on the Price Policy for Wheat for the 1975–76 season, the Commission wrote:

> Furthermore, in the present situation the overriding objective of consolidating the stabilising effect on the price level of the anti-inflationary measures which the Government has undertaken since last year, has to be accorded the highest importance. When the size of the current crop is promising to produce a softening effect on market prices, it would be most unwise to make the administered price produce a counter effect.

It may be added that this was the year of the Emergency and 7.54 million tonnes of foodgrains had been imported mostly on commercial terms in 1974–75 to keep down food prices and run the public distribution system. It was the Emergency and the highest ever import of foodgrains since the beginning of the green revolution in a single year, that were responsible for the softening effect on prices during the year and not the increase in the domestic production of foodgrains. The behaviour of the wholesale price indices of two commodity groups during the year provides an interesting, if not sad, comment on the working of the agricultural price policy. The general index of wholesale prices (base 1970–71 = 100) after touching a peak of 174.9 in 1974–75 fell slightly to 173 in 1975–76. Against this, the index for manufactured products rose from 168.8 to 171.2 while that for agricultural products declined from 168.8 to 157.3 during the same period. Control of inflation was sought and obtained at the cost of the agricultural sector through the repression of agricultural prices.

In the light of all this, it is nothing less than a travesty of facts on the part of Kahlon, a former Chairman of the APC, and Tyagi to claim that 'the main objective of agricultural price policy since 1965 [when the APC was established] has been to ensure an incentive price to farmers for maximising their production through optimum utilisation of resources without unduly affecting the levels of wages and industrial costs.'[83] They contradict themselves by stating elsewhere in their book that 'the APC has been conscious of the necessity of keeping inflation in check.'[84] The two objectives cannot go together. It is the latter objective that had a great influence on the APC in the formulation of its recommendations on agricultural prices, at least till the end of the Fifth Plan.

Looking now to the policy on agricultural exports, we find the policy displaying the same anti-agriculture bias at the macro-level of policy-making. Whenever the question is raised of export of wheat and rice on any significant scale to reduce the financial burden on the exchequer and the waste that mounting food stocks have come to impose, it has been vehemently opposed by the consumer lobby, the media and even by noted economists of the country on the ground that it is immoral to export foodgrains when a significant section of the country's population remains undernourished and lives below the poverty line. That is the argument at the populist level. At the more sophisticated level, the argument is

that exports would cause a rise in the domestic price of foodgrains and thereby adversely affect the poor. In the case of commercial and plantation crops also, similar considerations prevail. On the same grounds, exports are opposed, sometimes even in the face of a glut in the domestic market of the commodity concerned at the time, in cases like onions and potatoes. In other cases (such as, tea), export duties have been raised in the past at times to discourage export, with a view to keeping down the product price in the domestic market.

The conclusion is irresistable: while at the sectoral level agriculture has been given some encouragement in the form of public sector investments in irrigation works, the promotion of research and extension services, and the subsidisation of farm inputs, at the macro-level of policy-making the effect has been in the opposite direction. Wittingly or not, our development policies—trade, industrial, fiscal and monetary—have all been directed towards drawing resources from agriculture for financing the development of non-farm sectors of the economy throughout the planning era. Though agriculture is exempt from Central income tax and the land revenue rates levied by the state governments have become only notional, in monetary and more so in real terms, macro-level fiscal, monetary and trade policies of the Central government pursued over the past three decades have all combined to put a heavy charge on the farm sector. It is the latter which has been made to pay for the planned development of the economy. If a balance-sheet of the inter-sectoral flow of income between the farm and non-farm sectors over the last thirty-five years were to be drawn, the outflow from agriculture would be found to be far exceeding the inflow to it from other sectors.

An exercise done by a former Union Minister of Agriculture, Bhanu Pratap Singh, has shown that on account of adverse price relations with manufactures, agriculture was losing far more income annually to other sectors of the economy than the total plan outlays on the sector.[85] Over the eight year period (from 1975–76 to 1982–83), according to Singh's estimate, the loss to agriculture on account of its being offered adverse price parity was Rs. 38,220.4 crore while the aggregate plan outlays on the sector over the period was Rs. 23,655 crore. Table 5.2 gives, at a glance, the break-up of these estimates.

There could be a difference of opinion over the methodology

Table 5.2

Income Loss to Agriculture Due to Infra-Parity Prices vis-a-vis Public Sector Plan Outlays

Year	*Net Value Added from Agriculture (at Current Prices) according to National Income Statistics (Rs. Crore)*	*Index of Agricultural Production Original Base Triennium ending 1969–70 = 100 Converted to 1970–71 = 100*	*Index of Wholesale Prices of Manufactured Products (Base 1970–71 = 100)*	*Net Value that Would Have Been Added if there Had been Parity Between Agricultural Prices and Those of Manufactured Products (Rs. Crore)*	*Less Received due to Infra-Parity Prices (Rs. Crore) (Col. 5–Col. 2)*	*Loss on Only 60% of Agri-Products Actually Marketed* (Rs. Crore)*	*Public Sector Plan Outlays on Agriculture and Allied Sectors including Irrigation and Flood Control (Rs. Crore)*
1	2	3	4	5	6	7	8
1970–71	16,354						
1975–76	25,816	112.11	171.2	31.338	– 5,522	−3,313.2	1,228.7
1976–77	26,283	104.22	175.2	29,860	– 3,577	−2,146.2	1,694.8
1977–78	30,310	119.10	179.2	34,905	– 4,595	−2,757.0	2.231.8
1978–79	30,787	123.67	179.5	36,306	– 5,519	−3,311.4	2,612.4
1979–80	31,197	104.84	215.8	37,001	– 5,804	−3,482.4	3,284.4
1980–81	38,629	121.60	257.3	51,023	−12,394	−7,436.4	3,799.0
1981–82	41,840	127.28	270.6	56,637	−14,797	−8,878.2	4,176.7
1982–83	43,189	122.87	271.7	54,596	−11,407	−6,844.2	4,627.2
Total					−63,615	38,169.0	23,655.0

* It is estimated that 33 per cent of foodgrains and 90 per cent of all cash crops are actually marketed, giving a weighted average of 60 per cent of the total agricultural product; the contribution of foodgrains and the rest of the crops to value added in agriculture being 53 per cent and 47 per cent respectively.

employed by the author in computing the figures in Column 5 of the table. What he has done to arrive at the figure of income for each year given in the column is to multiply first the aggregate value of agricultural production in the base year 1970–71— which is shown at Rs. 16,354 crore—by the index of agricultural production (Column 3) in the year for which value added is to be found—and then multiply the total by the index of wholesale prices of manufactured products (Column 4) to arrive at the figure given in Column 5. This is a rough but simple and straightforward method of calculation. One could ask for the use of a more sophisticated statistical technique for arriving at the figure of what would have been the value-added amount of the agriculture sector in a particular year on the basis of assumptions made. For example, it may be suggested that the parity ratio between agricultural produce and manufactures, as given by their respective wholesale price indices, is used and the figure of value-added in agriculture given in Column 2 is multiplied by the corresponding price parity ratio for the year concerned to find the values given in Column 5.

This exercise was done by me and it was found to make some difference to the estimates given in Column 5. But, for one thing, the difference was small. For another, the point at issue is not the magnitude but the fact that the amount of drain of income and wealth from the agricultural sector caused by macro-economic policies followed in the name of development has throughout been more than the return of resources to the sector in the form of public sector plan outlays and investments on agriculture, irrigation and flood control, put together. It is the fact of overall loss of a part of its annual earnings by the agricultural sector to other sectors of the economy through monetary, fiscal, trade and price control policies pursued at the macro-level, that is important for our purpose here. And this fact comes out so glaringly that it becomes irrefutable.

It is the process of continuous drain of a part of the annual income of the sector that has been responsible for keeping down the rate of capital formation and private investments in the agricultural sector, stagnation of agricultural production in the non-irrigated areas of the country and the perpetuation of socio-economic problems of rural poverty, unemployment and growing income disparities. Modernisation of agriculture would require heavy

capital investments. It is a measure of the seriousness with which we take planning in this country that the Planning Commission has not so far thought it fit even to estimate, in quantitative terms, the capital requirements for modernisation of the agricultural sector (which contributes around 40 per cent of the national income and directly supports around 70 per cent of the country's population). There will have to be a radical change in our economic thinking and the whole attitude of planners and policy-makers towards agriculture if the economy is to be extricated from the bog into which it has been pushed by past policies and planning.

This is what lies at the root of most of our present troubles in planning and development. The resource crunch that the planners have come to face; the growing adverse trade and external payments balance; the menacingly growing level of annual budget deficits which contain inflationary potentials of serious proportions; and the continued sluggishness of the industrial growth rate since the mid-sixties are all the culmination of the unbalanced growth of the farm and non-farm sectors of the economy. In fact, the experience of the country with respect to development of the economy as a whole is not very dissimilar to that of development of the agricultural sector separately. In both cases, growth has been bimodal—one part showing vitality and advancing rapidly in the initial stages, leaving the other part behind in the race for growth, leading ultimately to a situation where the latter comes to constitute a drag on the development of the former and halts its growth. In the case of agriculture, it is the dryland rainfed agriculture that covers 70 per cent of the cultivated area in the country that has been left behind in the race for development. This pattern of growth has given rise to imbalances in crop production and disparities in regional income levels in agriculture. For the economy as a whole, imbalances have arisen from the unequal growth of the industry and services sector, on the one hand, and the agricultural sector, on the other. The sluggish growth of the latter has come to constitute a drag on the development of the former.

The remedy for the present situation lies in redressing the balance in the growth of the farm and non-farm sectors. This can be done only by undertaking a thorough review of the framework of macro-economic policies with respect to their impact on the fortunes of agriculture. At least some of them would be found to

be requiring drastic revision if balanced growth is to be achieved and challenges currently facing development planning are to be met. As noted by a veteran of Indian planning, Tarlok Singh, in 1974, 'a basic identity now exists between measures required to achieve adequate and sustained growth and those needed to secure substantial progress towards a more efficient rural economic structure.'[86] The World Bank, in its *World Development Report 1986*, is more forthright on this point:

> The experience of decades suggests that a healthy agricultural sector is critical to national growth. Taxing agriculture to force resources to industry will retard agricultural growth, lower domestic food and raw materials supplies to industry and reduce demand for industrial products . . . . Agriculture's intimate connections with growth and the wider economy mean that the cost of discrimination against agriculture are not borne by farming alone.[87]

It is time Indian planners realised this.

6

Technological Breakthrough and Policy Choices

If agriculture is to meet new challenges, which it is now called upon to do, it will have to be given a new scientific and technological base. The further growth of the farm sector to any appreciable degree, with the help of the old HYV-fertiliser technology, is neither feasible nor desirable. It is not feasible because the key element in the successful application of that technology is irrigation water. It is not possible to cover the entire country with irrigational facilities in the foreseeable future, not only because of the cost factor but also because of the existence of physical and needed water supply constraints in parts of the country.

It is not desirable because of two reasons: first, it is high-cost technology that is already making Indian agriculture an uneconomic business because of the constantly rising unit cost of production; second, it is wasteful of resources inasmuch as in rice cultivation, for example, only 20–30 per cent of the applied nitrogen, according to the Seventh Plan document, is actually utilised in the plant's growth, the balance being lost due to a variety of reasons (such as, denitrification, ammonia volatisation and leaching). The country has to go in for an alternative, more suitable, technology for the transformation of its agricultural economy.

New Agricultural Technology

It is, perhaps, a fortunate conjuncture that just when the need for alternative technology has come to be most keenly felt, a veritable

revolution in biotechnology and agricultural sciences hold out the promise of another agricultural revolution in the world, even more powerful in its impact than the one started by the inventions of Jethro Tull, Turnip Townsend, Arthur Young and others in Georgian England. The emerging hi-tech biotechnology scores over the twenty year old HYV-fertiliser technology in several respects. The most important among them is that it helps the country get out of the high-cost, high-price food economy trap in which we find ourselves caught at present.

There are two important considerations which should be kept in view when making the choice of technology in agriculture for future use: (*a*) a reduction in the cost of production without sacrificing yield, and (*b*) optimising the economic benefits from the available resources of land, water and labour to a farming family through multiple cropping, mixed cropping, mixed farming (including livestock and agriculture-cum-aquaculture systems). The aim has to be to make (*a*) rainfed and dryland agriculture economically viable and sustainable, and (*b*) raise substantially the income levels of the weaker sections of the farming community, particularly the small and marginal farmers, so that they are brought above the poverty line and rendered free from want.

The key elements in hi-tech biotechnology[88] are: (*i*) recombinant DNA or genetic engineering, and (*ii*) biofertiliser or nitrogen fixation in plants and soil direct from the atmosphere through the introduction of bacterial processes or chemical action. To these may be added (*iii*) improved farm management practices, and (*iv*) conservation and optimal utilisation of the available land and water resources through, among others, the use of newly emerging plasticulture technology. Currently, world interest focuses on the first, not only because of the revolutionary possibilities in the growth of agricultural output that it throws open, but also because of the immense opportunities for commercial exploitation of the technology by big business and multinational corporations in the advanced countries for corporate profits. In fact, the genetic supply industry has already become an issue in the North–South dialogue on reform of the existing International Economic Order.[89] For India, however, interest in both genetic engineering and biofertiliser technologies lies more in the transformation of rainfed and dryland agriculture which these can help to bring about.

Genetic Engineering

Recombinant DNA involves transferring genes from one living organism to another, producing, in turn, a new kind of living cell. Since such cells can reproduce at a rapid rate, their application for manufacturing a large variety of substances has become feasible. The rapid development of molecular and cellular biology in the seventies laid the scientific base of this new technology. Genetic engineers have proved disappointingly slow in delivering their promises of new drugs, foods or plastics. In transforming plants, however, they have astonished everyone by the speed with which their wildest predictions are coming true.

It is just five years since a gene was put into a tobacco plant. Yet, the technology for doing this has almost become routine.[90] Tobacco is a dicot plant. There were doubts that the technology might not succeed with monocots (to which category the three principal cereal crops—wheat, rice and maize—belong). These doubts were removed when Prof. Robert Schilpcroot and his colleagues at Leiden University in Netherlands discovered, in 1984, that the agro-bacterium code worked in monocots just as well as in dicots.[91] Now that the tool has been perfected and the applicability of the technology to the major cereal crops established, one may expect to achieve, in the not-too-distant future, spectacular gains in the yields of grain crops all over the world. Progress in this direction has yet to be made. Meanwhile, tomatoes have stolen the show. They are in the vanguard of the technology that makes it possible now for man 'to go beyond the confines of nature and tailor the characteristics of micro-organisms to productive requirements'.[92] Genetic engineering's first impact may be on the protection of crops against pests, with increase in yields getting attention later. But this should not discourage us or diminish in any way the importance of the new technology for the future. Along with micro-chips in electronics, it stands in the frontline of the world's technological advance that promises to transform the international economy by the turn of the present century. While the application of micro-electronics has a far-reaching impact on industry and services, biotechnology is expected to have similar consequences in the fields of agriculture and raw materials. Fortunately, the Government of India recognises this. 'It was coal and steampower,' said the former

Union Minister for Agriculture, Buta Singh, 'which fuelled the first industrial revolution. The second revolution was sparked by the chemical and electrical industries. The third industrial revolution is [being] bred by computers and bio-technology, which are frontier areas of development in India.'[93]

Some idea of the promise of higher yields that gene technology holds may be had from Table 6.1.

Table 6.1[94]
Improving Yields via Tissue Culture Techniques

Crop	*Present Yield (ton/hec.)*	*Potential Yield (ton/hec.)*
Sugarcane	70–90	150–200
Cussava	15–20	60–100
Tomato	20–40	60–100
Oil Palm	2–5	10–12
Peanuts	1–6	10–12

The potential shown in Table 6.1 for each crop is not imaginary. It is based on field experiments and observed scientific data. Still, it would be highly unrealistic to claim that the shown potential is immediately and everywhere realisable. All that is intended to be conveyed is the range of possibilities that have come to exist for increase in crop production from the same amount of land. For a country like India with so much land scarcity relative to the population to be supported on it, its importance cannot be exaggerated. It may not be out of place to point out that of the five crops mentioned, three are of direct relevance to the present agricultural problem of the country: oil palm and peanuts are in the vegetable oil-bearing crops group and sugarcane is the raw material for the sugar industry, in all of which the present production levels are deficient compared to the needs of the economy.

While the potential for increased crop production from the same land areas may take a few years to be realised, another advantage of gene technology of considerable significance to a country like India in search of cost-saving technology, is the development of seeds that make the plants resistant to fungal, bacterial and nematode (worm) diseases. This would save the farmer money, eliminate the risk of pesticide poisoning and reduce the burden on

the public exchequer arising out of subsidies paid on chemical pesticides. One chemical company in the U.S. is reported to be developing strains of bacteria to break down agro-chemicals in the soil. Others are at work on diseases of plants caused by insects, so that deliberate plagues can be spread among weeds and insects to kill them. Indian chemical companies, particularly those engaged in pesticide and fungicide production, could join in developing such strains. Though involving some R&D expenditure, the technology offers promise of rich dividends to companies taking up this business.

Biofertilisers

Closely associated with genetic engineering is biofertiliser technology. It is related to the former in two respects: (*i*) in part, at least, it is an aspect of genetic engineering, one way of biological nitrogen fixation being microbial genetic engineering; and (*ii*) it constitutes the substitution of chemical fertilisers by inexpensive microbial techniques which is of far-reaching consequence to the agricultural sector as well as to the economy as a whole.

Nitrogen is a basic nutrient for plant growth. At present, the major source of supply of nitrogen in agriculture the world over are chemical fertilisers (urea) based on naphtha or petroleum. The green revolution was based on an increase in the consumption of chemical fertilisers. Even today, the production growth projections in the five year plans continue to be based on the growth of consumption of nitrogenous fertilisers. For instance, the *Annual Report* of the Ministry of Agriculture and Cooperation for 1985–86 states:

> The use of fertiliser, along with irrigation and improved seeds, is the foundation on which crop production strategy has been built in the Seventh Plan. It is estimated that, on an average, for every tonne of fertiliser in terms of nutrients put into the soils, there is an increase of about 7 tonnes of foodgrains. As a result of sustained effort ... the consumption of fertilisers has risen by about 60 per cent over the five years of the Sixth Plan.[95]

Disadvantages (such as, too great a dependence on chemical fertilisers as a means for raising agricultural productivity) are

coming to be increasingly realised, even in rich countries like the U.S.[96] and U.K. A three year study of the nitrogen cycle in Britain undertaken by the Royal Society found that (*i*) only one-tenth of the nitrogen added to agricultural land ends up in food, much of the rest escapes into the environment; (*ii*) in some drinking water supplies the nitrate levels already exceed those allowed (on public health grounds) by the EEC Directive on the subject; and (*iii*) one-third of the acidity in rain is due to nitrates.[97]

Thus, 'Nitrogen is an ambiguous element. As Dr Jekyll, it fertilises plants and feeds animals; as Mr Hyde it poisons water supply and acidifies rain. Recent industrial and agricultural practices seems to be giving Mr Hyde the upper hand by pushing more nitrogen into pollutants.'[98]

Biofertilisers are produced by the action of a certain kind of bacteria (called rhizobium) that live in special nodules in the roots of leguminous crops like soyabeans, pulses and groundnuts. These bacteria have the natural power to extract nitrogen from the air to build their own tissues and to convert it into ammonia and nitrates. Ammonia and nitrates are then absorbed by plants and transformed into proteins. A contractual relationship, so to say, is thus built up between the host plant and the nitrogen-fixing bacteria, the former providing food and lodging in exchange for the nitrogen rent from the paying guest. For long it was thought that only nodule-root crops could benefit from this process because the nitrogen-fixing bacteria made only nodules habitat. But some Brazilian scientists have discovered that even non-nodule producing plants (such as sugarcane) can fix nitrogen from the air. Plant-bacteria association in the root systems of wheat, sorghum and maize has been established. Four new Azospirillum and one new Bacillus species have been discovered. The consequences of this discovery cannot be exaggerated or over-emphasised. This means as great a revolution in technology as genetic engineering. Brazilian scientists have already demonstrated its benefits. In 1964 they began persuading soyabean farmers to concentrate on the nitrogen-fixing ability of the plant rather than increasing yields with fertilisers, as farmers in America did. Now this export commodity consumes no nitrogen fertiliser, yet a year's crop contains $1 billion worth of nitrogen.[99]

The use of biofertiliser or rhizobium culture in leguminous crops

is now becoming widespread in the U.S., Australia and New Zealand. Rhizobium (in the form of powder) is used to coat pulses, seeds and legume oilseeds in order to help increase the supply of nitrogen by the biological fixing process. According to the former Union Agriculture Minister, Buta Singh, 'in the pastures of New Zealand, rhizobium has helped to provide annually more than 1.1 million tonnes of nitrogen.' 'This,' he added, 'is a pointer to us in India.'[100]

Indian scientists have found another biological medium for fixing nitrogen from the air. This is blue-green algae, which does for wetland paddy what rhizobium does in the case of leguminous crops. According to the Director-General of the Indian Council of Agricultural Research, N.S. Randhawa, extensive research trials and field demonstrations in India have shown that effective strains of rhizobium culture can add up to 60 kgs. N/ha in the legume pulses and legume oilseed crops. Similarly, the use of blue-green algae has been found to add about 25 kgs./ha of nitrogen to the wetland rice soils.[101] The cost of 500 gms. of rhizobium that would produce 60 kgs. of nitrogen is Rs. 20 and the value of nitrogen produced is Rs. 280. Similarly, the cost of blue-green algae (which produce 25 kgs. of nitrogen per hectare worth Rs. 190) is only Rs. 15. The country has about 30 million ha under pulses and legume oilseeds and 16.8 million hectares under wetland paddy. If we apply rhizobium and blue-green algae respectively to all the legume and wetland paddy crops, we could produce 1.8 million tonnes of nitrogen in leguminous crops and 0.42 million tonnes in wetland paddy crops, or a total of 2.2 million tonnes of nitrogenous fertilisers in the country in 1985–86. The value of the nitrogen thus produced, at Rs. 4,500 per tonne, comes to Rs. 990 crore. Against this, the production cost of rhizobium and blue-green algae would be Rs. 85.2 crore, which means a net saving of over Rs. 900 crore to the country per annum in the cost of nitrogenous fertilisers alone (apart from escaping the damaging effects to the soil and environment from the use of chemical fertilisers).

Application of biofertilisers need not remain confined to legumes and wetland rice crops: the possibility of its use in certain varieties of sugarcane has already been demonstrated in Brazil. Scientists are busy establishing the scientific basis of nitrogen fixation from the atmosphere by rhizobium and blue-green algae.

In recent years, microbial genetic engineering has emerged as an important area of research in the field of biological nitrogen fixation. Once the bio-chemical basis for infection, nodulation and symbiotic N-fixation is known, they could supplement/amend the non-leguminous host plants through bio-chemical means and induce them to accept the symbiotic partners. The most efficient and most speculated system is to build a N-fixing (nif) genes apparatus directly into plant cells. The leading cereals are currently the most attractive subjects for such introgression. Possibilities of transferring nif genes to a variety of new bacteria also exist. Breeding blue-green algae of the same constitution to be used in factories for making atmospheric nitrogen into ammonia, at the expense of solar energy, is considered by scientists to be a viable process fit to be tapped on a large scale. There is also scope for improvement in the quality of rhizobium inoculants. Response to the use of a rhizobium inoculant in field conditions has been varied. The reason is that rhizobiums are crop, soil and environment specific. Careful research at the local level to find the appropriate rhizobium culture suiting different crops in different soil conditions is necessary.

There are hopeful signs in India of making progress in these directions. Research work under the All India Coordinated Project on Biological Nitrogen Fixation and the INDO-US Senior Collaborative Programmes of the ICAR has organised several research programmes, which include survey; ecology; evaluation and interaction of host germ-plasm and agricultural chemicals; genetic studies to enlarge the host spectrum; somatic hybridisation and physiological studies. There are high expectations from the research work under these research programmes.

On the production side, the Government of India has sanctioned in 1985 a national project on the development of biofertilisers. Under it, the establishment of one national, six regional and forty subcentres for the production of rhizobium and blue-green algae has been sanctioned. These centres will produce 350 tonnes of rhizobium and 400 tonnes of blue-green algae annually. The project also provides for the transfer of technology to the farmers and for quality control. The biofertilisers suitable for different locations are also proposed to be researched into by the centres.

The current total production of rhizobium culture and blue-green algae in the country is estimated at about 500 tonnes. Against this, the estimated requirement of the country at the present stage of knowledge of their use, is 168,000 tonnes of blue-

green algae and 15,000 tonnes of rhizobium culture. The technology for production of rhizobium culture has already been standardised and it has already come to be produced on an industrial scale in the U.S., Australia, U.K. and New Zealand. There are problems involved in the safe storage of the products for a long period and, therefore, in distribution over a wide area. For the moment, at least, with the given state of knowledge, production in a vast country like India has to be regionally dispersed and be on a small scale. It may not be viable for the corporate sector to enter the manufacturing of rhizobium culture but small scale private units and farmers' cooperatives should be encouraged to do so.

Scientific Farm Management

There is considerable scope for increase in crop production, reduction in production costs and raising of income levels of farm families through the application of multiple-cropping and mixed-cropping technologies, using integrated nutrient supply methods, improved biomass utilisation for crop growth and other crop management practices and technologies.

These technologies are relevant to the land-scarce surplus labour agrarian economies of Asia, particularly China and India. Japan and some newly industrialising countries of the Far East and South East Asia (like Taiwan and South Korea) have already demonstrated what can be achieved if small farmers adopt simple but highly effective farm management technologies. By adopting integrated farming systems, China increased single paddy crop yields from 1.5 tons per hectare to 8 tons per hectare in twenty-five years.[102] In some of the more advanced communes, an annual output of 20 tonnes of grain per hectare has been achieved in China through multiple cropping.[103]

The rationale for adopting multi-cropping is not merely to increase land-use intensity which, in a land-scarce economy like China, in itself is an extremely important object. Other reasons for doing so include taking full advantage of the wide variations in temperature and agro-climatic conditions from one part of the year to the other, and the immense manpower available for farming; and the existence of demand for a wide variety of agricultural products. China's experience can become a model for India as well as for other developing countries. In China, by growing three crops per unit area per year, yields of up to 18/20 tonnes per hectare

have been achieved and, in the better vegetable growing areas, harvests of 150 tonnes per hectare per year are common.[104] This gives an idea of what can be achieved in India over the next fifteen years by adopting multiple cropping and other farm management techniques.

A beginning has been made in research for evolving multiple and inter-cropping systems specific to local climatic, soil and water availability conditions in different parts of the country. According to the Department of Agricultural Research, 'with optimum inputs it was found possible to harvest up to 9.5 tonnes of grain/ha/year with good management by growing 2 cereal crops in sequence followed by a pulse crop in summer.'[105] The IAR scientists have identified crop sequences in multiple cropping systems in different parts of the country that can give an annual income of up to Rs. 38,000 per hectare a year. For example, in Kalyani (West Bengal) in field experiment verification trials, rice-potato-rice rotation has been found to yield a gross income of Rs. 38,289 and a rice-potato-jute rotation Rs. 37,634 a year per hectare. In Bhubaneshwar, rice-potato-rice rotation yielded annually a gross income of Rs. 35,943 per hectare. In Bichpuri (Agra) maize-mustard-green gram rotation gave an income of Rs. 16,779 per hectare per year.[106] A more interesting result is the saving of land effected through inter-cropping. It was found in Bijapur that one hectare of land sown in a 3:1 row-ratio with sorghum and pigeon-pea yielded 25.3 quintals of sorghum and 7.6 quintals of pigeon-pea. To raise the same quantity of produce would require 1.88 hectare of land if the crops had been raised separately. Inter-cropping thus meant saving 0.88 hectare of land for every 1.88 hectare. In Sholapur, the saving was 0.92 hectare with inter-cropping of pigeon-pea and sunflower sown in paired rows.[107] This illustrates the promise that the development of scientific multi-cropping and inter-cropping systems hold in the country.

This is just part of the whole range of crop and land management techniques that are extending the frontiers of attainable productivity levels and cost saving in farming. There is a whole variety of similar improvements in crop management waiting to be incorporated into the Indian farming system, besides improvements that may become available in the future. Only two examples may be given. These are integrated nutrient supply and integrated pest control systems. The first promises both saving of cost and increase in productivity. As already noted, as much as 80 per cent

of the applied nitrogen to the rice crop could be lost due to a variety of reasons such as: (*a*) loss of ammonia volatisation; (*b*) nitrification followed by denitrification; (*c*) biological immobilisation, especially by algae; (*d*) fixation of ammonium nitrogen by clays; (*e*) leaching; (*f*) run-off; and (*g*) seepage.After identifying the precise cause for the loss, suitable methods for minimising, if not altogether eliminating, the loss could be introduced. In long term trials, the IRRI (Manila) and the Philippine Ministry of Agriculture and Food at many sites in the Philippines have identified an optimum soil carbon content of around 2 per cent. Results of 125 field experiments in the dry season in 1984 indicated that on soils containing more than 2 per cent carbon (= 4 per cent organic matter) grain yields up to 5 t/ha. could be achieved without application of nitrogen fertilisers. The maximum yields on these fertile soils have been found to be 3.7 t/ha. without nitrogen fertiliser application. Achieving 5 tonnes and above has been found to be feasible only with an integrated nutrient supply system involving an optimum blend of biofertilisers, organic manures and mineral fertilisers.[108]

The second case of efficient farm management is the introduction of integrated pest management (IPM) and improved post-harvest technology. This would mean combining biological control measures with the use of appropriate quantities of chemical pesticides, along with control of conditions that give rise to specific crop disease and pests. Plastic covers and nets are coming into use for plant protection in supplementing the action of fungicides as well as to protect plants against hail and mildew in vine nurseries and grape culture.[109]

Soil and Water Management and Conservation

Finally, there is vast potential for increasing production, employment and income waiting to be tapped through improvements in soil and water management and ecology preservation. Till recently, this subject did not receive in India the attention of policy-makers and planners that it deserved. In March 1980 the Union Ministry of Agriculture estimated that as much as 175 million hectares (of the country's total area of 305 million hectares for which records exist) are subject to environmental problems. The break up is shown in Table 6.2.

Table 6.2
Land Area with Environmental Problems

Problem	*Area (million hectares)*
Serious water and wind erosion	150.00
Shifting cultivation	3.00
Waterlogging	6.00
Saline soils	4.50
Alkaline soils	2.50
Diara land	2.40
Other culturable waste fit for reclamation	6.60
Total	175.00

The cost, to the national economy, of the neglect of scientific management of the soil resources is of staggering proportions. According to a 1972 estimate, India was losing annually about 6,000 million tonnes of top soil on account of wind and water erosion. In terms of major NPK nutrients, at 1972 prices, the value of the annual loss of top soil amounts to Rs. 700 crore. The figure today must be around Rs. 1,000 crore.

The neglect of the scientific management of water resources is the same story. Erosion of the top soil caused by floods resulted in an average annual loss (in terms of NPK) of Rs. 1,060 crore in the three year period from 1976 to 1978, according to the estimates made by National Floods Commission, 1980. According to same source, the total area in the country subject to periodic floods was 20 million hectares in 1971 and 40 million hectares in 1980, which means the alarming increase of 100 per cent in ten years.

There are other losses which cannot be easily quantified. These include the premature siltation of tanks and reservoirs and the wastage of rain water, in run-offs, which could have been retained in the form of ground water had there been no denudation in the Himalayas and other forest areas. There is also the additional fact to remember in this connection, that fully recharged aquifers play a significant role in moderating river flows. They contribute to river discharges during the lean season and thus alleviate, to a degree, the effect of dryness in summer and drought in the drought years. Aggravation of the twin problems of flood and drought is, thus, another price that the country has to pay for poor land and water management.

There are two aspects of soil and water management problems. The first is conservation of the available resources and environment; the second, optimum utilisation of the available resources through scientific management. The obvious policy measure required for the first is a massive programme of afforestation over the next fifteen years along with effective steps against unauthorised felling of trees. Some initiatives, like the creation of a separate Department of Forests and Wildlife at the Centre and the introduction of Social Forestry and Production Forestry programmes, have recently been taken. These mark only a beginning in the desired direction. A far more vigorous thrust is needed if the requirements of the case are to be met. Meanwhile, some technological issues have emerged even here. So far, heavy reliance has been placed on the plantation of seedlings of exotic species. The need, as the Planning Commission points out, is now to identify suitable indigenous species for specific climatic and edaphic conditions.[110] The species chosen should have a fast growth rate and be capable of bringing about an improvement in the environment, including improving the soil and moisture regime.

The second aspect of the land and water management problem relates to soil research, dry-land and wasteland farming and efficient water use. The record of research and use of modern technology in these fields is slightly better than in the field of afforestation[111] but is still not very satisfactory. Soil research has started concerning itself with 'developing technology for the reclamation and management of saline soils, lining of acid saline soils, arid lands management, correlation of soil tests with crop response, micro-nutrient research in improvement of soil's physical conditions, and developing crop varieties for salt tolerance.'[112] All this is a welcome development and, if pursued vigorously, it should be able to secure to the country at least 45 million hectares of land now lying waste for one reason or the other. Also, it can contribute magnificiently towards an increase in agricultural production over the next fifteen years.

Technological Challenge in India

The latest advances in biotechnology present India's planners with both an opportunity and a challenge. There is now the opportunity

available, as never before, to transform agriculture and through it the entire character of the Indian economy, with the help of new scientific knowledge and fast-emerging biotechnologies. The importance of the promise that the new discoveries in molecular and cellular biology hold for revolutionising agriculture in the rain-fed and dryland areas, cannot be overemphasised. It is the virtual stagnation in these areas in the midst of rapidly growing productivity and output levels in the irrigated regions over the last 20 years that is responsible for not only disparities and imbalances that have arisen in crop production but also, at least in part, for the sluggishness of the industrial growth rate, intractability shown by the socio-economic problems of poverty and unemployment (despite massive plan outlays on developmental activities), and the depressing general outlook that the economy presents today after thirty-seven years of planning. Strengthening the agricultural base with the help of new technology will electrify the growth process and revitalise the entire economy. The new agricultural technologies, therefore, give a new message of hope for the development of the Indian economy. The opportunity thrown up by the recent developments in agricultural science and technology for accelerating the growth rate of the economy and solving seemingly intractable socio-economic problems of poverty and unemployment is too great to be missed by the country's planners and policy-makers.

This becomes their challenge as well. Now is the time to recast the development process, reform planning and reformulate the development strategy. In the changed context of growth possibilities in the farm sector that have now arisen, a development strategy based on agriculture acquires new meanings and credibility. The earlier scepticism about agriculture being able to provide growth impulses to the rest of the economy cannot be sustained any longer. If agriculture were modernised and the income levels of farmers substantially raised by the introduction of new farm technologies and practices, this would benefit, along with agriculture, all other sectors of the economy through linkages that exist between the farm and non-farm sectors of the economy on both the demand and supply sides. To argue in favour of a development strategy that will have modernisation and the rapid growth of the agricultural sector as the starting point is no more a heresy in development economics which it was thought to be till as long as the late sixties.

Indian planners do not seem to have fully grasped the significance, to the prospects of the country's future economic development, of the new developments in agricultural sciences. Nevertheless, the Seventh Plan is said to mark the beginning of the process of transformation which 'by the close of this century . . . should take agriculture to a level where it will be far more science-based and industry-linked than it is now.' Further, 'emerging areas like biotechnology, genetic engineering, photo-synthesis, tissue culture, bio-insecticides and pheromones would be the new fields of research for aiding the growth of agricultural productivity.'[113] The list is repetitive in respect of some items while it leaves out some of the most important areas, like biofertilisers. This simply shows that the entire approach to the subject is casual if not ill-informed. It is unfortunate that we have such a palpable degree of ignorance and casualness prevailing at the highest levels of planning in a subject which holds the key to the future growth of the economy and well-being of the people.

In the section on Agricultural Research and Education, the Plan document lists the following as the priority areas for the Seventh Plan Period: (*a*) reducing the gap between potential and actual yields by evolving new varieties/strains of crops, incorporating multiple resistance against pests and diseases, saline and alkaline soils, drought and flood; (*b*) evolving technology acceptable to the farmers in the lowland and upland areas for increasing rice production and productivity; (*c*) evolving suitable dryland technology for each block, or group of blocks, in the predominantly rainfed states, taking risk factors into consideration; (*d*) varietal breakthrough in pulses and oilseeds; (*e*) conservation and planned exploitation of germplasm resources of plants, animals and fisheries to broaden the genetic base for improvements; (*f*) human resources development, with special reference to weaker sections of the community; (*g*) strengthening the activities in respect of biotechnology; and (*h*) greater research support to agro-meteorology.[114]

The list reads like a cure-all mixture, lacking intent and a properly defined purpose. The contents individually are vague and collectively lack internal cohesiveness. The list seems to have been drawn up with an amazing degree of casualness. Otherwise, how does one explain the inclusion of item (*f*) in the list of priority areas of research in agricultural science and technology? And what exactly is meant by 'strengthening the activities in respect of bio-

technology'—item (*g*) in the list? Is biotechnology not a comprehensive term which would cover 'evolving suitable dryland technology' (item *c*), 'reducing the gap between potential and actual yields by evolving new varieties/strains of crops, incorporating multiple resistance against pests and diseases . . .' (item *a*) and 'varietal breakthrough in pulses and oilseeds' (item *d*)? While discussing the working of various schemes and programmes for the improvement of dry-land farming during the Sixth Plan period the Seventh Plan document laments: '. . . these programmes function in isolation and an integrated approach on an area development basis could have created a much better impact.' Can the same not be said about the listed R&D programme of agricultural development during the Seventh Plan?

7

Ecology and Agricultural Development

Past Record

In any perspective planning of agricultural development, land and water resource development should occupy the top place. But, in India, this is one of the most neglected aspects of policy planning in the agricultural sector. Projections of the future supply potential and possibilities of foodgrains and other commercial crops do take into consideration the addition of production from the expansion of irrigation but ignore completely the gains that might be made through reclamation of waste, barren and waterlogged land for productive use.

There has been much talk and numerous schemes, programmes and projects of soil conservation and land reclamation over the last thirty years but there is little actual progress which can be seen in those directions. The situation with regard to the preservation of the ecological balance and the maintenance of even the existing low level of soil fertility is getting increasingly worse every day, not to speak of any positive improvement having been made with ali the Plan outlays and investments.

As far back as in the Second Plan period, besides a programme of soil conservation and dry farming in several states. an integrated All-India Soil Conservation and Land Use Survey was initiated. Forty-five dry farming projects, each covering 400 hectares, were undertaken for popularising dry farming techniques. A beginning

was made with special soil conservation programmes in the catchment areas of river valley projects. During the Third Plan, in thirteen major river valley projects (such as, Bhakra Nangal, Damodar Valley and Hirakud) a catchment survey programme was taken up. The programme of demonstrations on dry-farming was further strengthened in the Fourth Plan. An 'area saturation' approach was adopted in soil conservation work. The preparation of river basin-wise master plans was taken up. To augment and strengthen the state plan programmes, provision was made in the Central sector for a large number of projects (such as, the treatment of badly eroded areas in the catchment of twenty-one river valley projects, pilot projects for the reclamation of riverine lands, the setting up of a resource inventory centre, and so on). Emphasis was laid on soil conservation measures in the Integrated Dryland Agricultural Development Programme, the Drought Prone Areas Programme and the Crash Programme for Rural Employment. From the Fifth Plan onwards, soil and water conservation programmes came to be taken up on the basis of the watershed approach. The Sixth Plan promised to give intensive attention to soil conservation measures in small watersheds with an area of 1,000–2,000 hectares, the 'treatment of which is practicable and manageable'. The target fixed for the treatment of additional areas for soil conservation during the Plan period was 7.1 million hectares (as against 23.4 million hectares said to have been covered by soil conservation measures during the period of the first five plans).

The Current Challenge

This is the planning record of dealing with the problem of soil degradation and the development of the soil and water resources of the country. What are the achievements of all the plan efforts in this regard? Officially, 23.4 million hectares of damaged land had been 'treated' by the end of the Fifth Plan through various projects and programmes aimed at soil conservation and development. The available official data on land use, however, does not give any evidence of this. Table 7.1 gives the land use data for 1978–79 under various heads.

Table 7.1 makes sad reading. In this land-hungry country, 33

Table 7.1
Classification of Land Use in India 1978–79

		Area (million hectares)	*Percentage of Total Geographical Area*
I.	Geographical area	328.78	100.00
II	Reporting area for land utilisation statistics (1–5)	304.68	92.67
1.	Forests	67.44	20.51
2.	Not available for cultivation (a+b)	39.30	11.95
(*a*)	Land put to non-agricultural use	17.80	5.41
(*b*)	Barren and unculturable land	21.50	6.54
3.	Other uncultivated (excluding fallow) land (a+b+c)	33.01	10.00
(*a*)	Permanent pastures and other grazing land	12.15	3.70
(*b*)	Land under miscellaneous tree crops and groves not included in net area sown	3.91	2.20
(*c*)	Culturable waste	16.95	5.06
4.	Fallow land (a+b)	21.99	6.68
(*a*)	Fallow lands other than current fallows	9.55	2.90
(*b*)	Current fallows	12.44	3.78
5.	Net area sown (6–7)	144.94	43.45
6.	Total cropped area	175.18	—
7.	Area sown more than once	30.24	—
III.	Net irrigated area	37.96	11.55
IV.	Gross irrigated area	48.09	—

per cent of the geographical area is being allowed to go waste, as against 43.45 per cent of the area that is put under the plough. Land put to non-agricultural use accounts for 5.41 per cent of the total geographical area of the country. Against this, the area classified as 'barren and unculturable' amounts to 21.5 million hectares (or 6.54 per cent of the country's total geographical area). This represents probably the most severely eroded areas. The three categories 'barren and unculturable,' 'culturable waste' and 'fallow lands' together make a total of 60.14 million hectares (or

18.28 per cent of the geographical area of the country). This is indicative of the extent of the 'neglected land management' to use the National Agriculture Commission's phrase. Again, another 12 million hectares (3.7 per cent) categorised as 'permanent pastures and other grazing lands,' according to the Agriculture Commission, 'perhaps represent, fallaciously though, some of the worst eroded areas.' 'Whether it is the pasture lands of the desert,' the Commission Report continues, 'or of the high hills, they are characterized by unchecked misuse.'[115]

Let us look at the picture differently. The total area of the country for which land use statistics are available is around 305 million hectares. Of this, 18 million hectares are under urban and other non-agricultural use. Another 21 million hectares are classified as barren and unculturable, perhaps for certain intrinsic disabilities (such as, the lands being perpetually snowbound or too rocky to lend themselves for cultivation). The relevant area for consideration of the land use problem is thus 266 million hectares. Of this, again, 40 million hectares are accounted for by culturable wasteland (around 18 million hectares) and fallow land excluding current fallows (22 million hectares). This area, by definition, is capable of crop production but is lying uncultivated apparently because it has suffered soil degradation. Of the remaining 226 million hectares, 143 million hectares represent agricultural land and 83 million hectares forests (that is, 67 million hectares forests, 12 million hectares permanent pastures and 4 million hectares groves and miscellaneous tree crops). However, only 35 million hectares of the total forest area is said to be under good tree or grass cover, the rest (48 million hectares) being more or less completely devoid of vegetation. If we add these 48 million hectares to the 40 million hectares that have gone out of production for one reason or another, we have a total of 88 million hectares, representing over 33 per cent of our total relevant area of 266 million hectares, that is more or less completely unproductive. This means that 72 per cent of the total non-agricultural land amounting to 123 million hectares (266 million hectares of relevant area minus 143 million hectares of agricultural land) is lying waste today. Given the necessary policy thrust and action as well as required public investment, at least 50 per cent of this area—say around 45 million hectares out of the total of 88 million hectares—could be covered with vegetation and made productive.

It is a colossal national waste to allow such a large part of the scarce natural resource to go waste.

In addition to all this, a considerable part of the 143 million hectares of agricultural land is also sick and continuously getting degraded. According to an official source, 87 million hectares (or 61 per cent of the total agricultural land area) is afflicted by serious soil erosion and waterlogging and salinity problems. This means that three-fifths of our agricultural land is also sick and needs tending.

Floods: The story does not end here. There is also the destruction wrought annually by floods. According to the National Commission on Floods, the area affected by annual floods now stands at around 40 million hectares (as against 25 million hectares thirty-five years ago). The total area affected by floods in the period 1953 to 1981 has been estimated at 235.6 million hectares, which gives an annual average of 8.1 million hectares. The total population involved in losses through floods during the period was 795 million, giving an annual average of 27.4 million. The loss of cattle in floods was 2.8 million heads over the period and damage to crops amounted to Rs. 7,200 crore (or an average of Rs. 248 crore a year). To these are to be added the losses due to damage to houses and other property, and public utility installations and constructions. The total material loss due to floods over the period comes to the colossal figure of Rs. 11,800 crore (or an average of Rs. 407 crore a year). All this excludes the incalculable loss of invaluable rich soil washed down from the upper reaches of the river basins by the floods.

The question of the increasing frequency and virulence of floods and the consequent (apart from material losses) growing menace of soil erosion in the watershed and catchment areas, is intimately connected with the thoughtless destruction of forests and felling of trees in the Himalayas that has been allowed to continue over the last thirty-five years. The present state of the Himalayas has been described as the mountains 'really crumbling and bleeding profusely'. Protection of the Himalayas can make a valuable contribution to the prevention of soil erosion from wind and water and the restoration of soil productivity.

Waterlogging and Salinity: Waterlogging is the second major

threat to the country's precious land resources. In soils which are not naturally well drained, the presence of excessive surface water results in a rise in the sub-soil water table till the water reaches the root zone of crops. The affected land thus begins to lose its productivity and ultimately becomes altogether barren. The situation is further vitiated by the effervescence of harmful salts which the rising table of water continues to wash up to the surface. According to the latest available information, the areas which have already gone out of production on account of waterlogging and salinity total 13 million hectares. Of this, about half the land area is situated in estuarine and coastal regions which have long been lost to cultivation and about which perhaps little can be done. However, at least 6 million hectares comprise lands which were, till recently, quite productive and are now lost to waterlogging and salinity due to man-made situations. The first, and lesser of these situations, arises from impediments which have been created in the way of natural drainage by engineering works (such as, flood control embankments and roads, rail and canal embankments). If, as is often the case, such embankments do not contain adequate cross-drainage works, water gets held up against them. The surrounding areas get submerged and damaged. This situation can be remedied by the construction of adequate cross-drainage works wherever needed.

It is, however, the second kind of situation, peculiar to canal irrigated areas, that should cause serious concern. Lands in canal areas are normally flat and poorly drained. The construction of canals here and irrigation therefrom result in the constant seepage of water which, in turn, raises the underground water table culminating in waterlogging and salinity in course of time. This process is hastened by two other factors. First, the application of canal water to crops is generally in excess of their needs because of three reasons: (*i*) the absence of proper distributary channels; (*ii*) want of effective regulatory mechanisms, installations and equipment at the outlet heads to control distribution and measure water use by the farmer for each field; and (*iii*) water charges bear no relation to the cost of irrigation water supplied or the amount of irrigation water used in a field. The second factor which hastens waterlogging is the seepage of water in the canal itself which, in the case of unlined canals, is estimated to amount to as much as one-third of the total discharge in the canal. The total seepage of

irrigation water from the main canal and distributaries put together is estimated to be as high as 40 per cent of the discharge into the canal at the headwork or reservoir.

Waterlogging in canal irrigated areas is a global phenomenon and few countries with extensive systems of canal irrigation have escaped the ravages of waterlogging and salinity. In Pakistan, for instance, 11 million out of a total 15 million hectares of canal irrigated land is already afflicted by this malady. Egypt, Syria and Iraq have had a similar fate. There is no easy solution to the problem. Care has to be taken at the very outset when designing irrigation projects to see that the natural drainage in the area is least obstructed or cross-drainage is provided to prevent rain water accumulating and seeping down in the rainy season; the canal course is lined at the bottom and on two sides with brickwork and cement; field channels and drains are designed and built not on the basis of individual holdings but on the natural drainage of the entire watershed or command area; a prior agreement on the consolidation of their holdings on the part of land owners and redrawing of field boundaries to permit the even and unobstructed flow of water to the fields in an orderly manner; and, giving effect to that agreement simultaneously with the irrigation system becoming operative. It is not easy to achieve all this. Apart from the heavy financial outlays involved in making all these arrangements, there are several technical, social and legal difficulties that have to be overcome to give effect to the above proposals. This is why anti-waterlogging operations have not registered much progress anywhere.

However, the conjunctive use of ground and surface water for irrigation purposes, which is being practised extensively in Punjab and Haryana by force of circumstances rather than by design, offers considerable hope in the matter. Canal irrigation should be supplemented by tubewell irrigation on an extensive scale. This would continue recycling the water as well as provide irrigation in required quantity throughout the year thereby increasing cropping intensity and raising productivity per hectare. The average cropping intensity in Indian agriculture at present is 123 per cent. In Punjab, however, it is 159 per cent and in Haryana, 152 per cent. The high cropping intensity in the two states has not been made possible by canal irrigation alone; the rapid growth of tubewell irrigation since the beginning of the green revolution in these

areas to supplement canal irrigation has made an important contribution to this development.

There can be other ways, specific to each situation, to solve the problem of waterlogging and, at the same time, increase land productivity. S.S. Johl, in his Presidential Address to the 43rd Annual Conference of the Indian Society of Agricultural Economics, has suggested that water in the south-western parts of Punjab and the adjoining areas of Haryana which suffers from waterlogging because the level of these lands is lower than the level of the river bed which is expected to drain these lands, be pumped into drains and taken through lined canals to the neighbouring Rajasthan to irrigate its land. This would solve the waterlogging problem of the former and provide much needed irrigation to the latter.

> The supply of fresh sweet canal water to the salt-affected waterlogged Punjab and Haryana areas and the pumping out of underground brackish water will rehabilitate these lands for two bumper crops a year. Besides, a conjunctive use of brackish water with canal water in dunal areas can yield good crops of all types since the structure of these sandy soils is such that water with even three thousand ppm salt concentration can be easily used without any adverse effect.[116]

This is just one example of what a well designed and nationally planned effort at land and water resource management could achieve in the realm of extension of cultivation and augmentation of agricultural production in the country. Agricultural scientists and engineers could think of several other schemes of a similar nature for other parts of the country. This, however, implies that the problem of efficient management of the available land and water resources is viewed strictly in a national perspective and not on the basis of individual states and state boundaries.

The Seventh Plan document does not indicate that any thinking is being done on these lines at the highest level of planning and policy-making. In the section on 'Conjunctive Use of Surface and Ground Water' in the Plan document, all we have got is the following single paragraph:

> *The conjunctive use of surface and ground water would be encouraged in the minor irrigation programme.* The dugwells

> programme in the command areas would be encouraged under the Command Area Development Programme, for supplementing canal irrigation. The conjunctive use programme under the various development sectors would be coordinated so that existing irrigation facilities are put to the best use and the gestation period of irrigation utilization under major and medium irrigation schemes is reduced (emphasis added).[117]

At another place in the document, under the head 'Waterlogging and Salinity,' we are told:

> In all major and medium irrigation projects and specially where these are in water-scarce areas, highly water-intensive crops would be discouraged and agricultural output maximized per unit of water by ensuring equitable distribution of water to farmers . . . . In existing irrigated areas where salinity and water-logging have resulted in good agricultural land becoming unusable, adequate drainage facilities would be provided on a priority basis and proper usage of surface and ground water encouraged as also reclamation and revised cropping pattern for preventing recurrence of water-logging and salinity.[118]

This is about all that the Planning Commission has to say on the subject so far as the Seventh Plan is concerned. With regard to the development perspective for the next fifteen years, the Commission does not have anything to say. The obsessive preoccupation of the planners and policy-makers to push on with the construction of large and medium canal irrigation works blurs their vision and prevents them from taking a broader and more practical view of irrigation development in the country. Only the latter course could have enabled them to appreciate the importance of the approach to the irrigation problem of the country based on the conjunctive use of ground and surface water.

Integrated Management of Land and Water

Integrated development of land and water resources should have formed the basis of all economic planning in the country from the very outset. Unfortunately, even today, there is no evidence of a

policy of integrated management of land and water resources emerging in the country. The two agricultural resources, land and water, should not be viewed in isolation from each other, as has been done so far. There is an inextricably close relationship in the management of the two. Water, which is a renewable resource, can, in fact, be put to good use only if the land on which it falls, and the land to which it is applied, are properly cared for. Land, which is for all practical purposes a non-renewable and inelastic resource, must be managed in such a manner as to be benefited rather than suffer damage as a result of its contact with water. 'The key to India's environmental quality,' says the Planning Commission, 'lies in scientific land and water management above all else.'[119] This is a gross understatement of the role that scientific and well integrated land and water management can and should play in the development of the national economy as a whole.

The neglect of this factor in our developmental planning is palpable. As the Planning Commission puts it:

> We have paid a good deal of attention to harnessing our resources by way of construction of major, medium and minor irrigation projects and the development of ground water resources. Adequate organizations have also been built up in this field in the shape of Central and State Irrigation Departments, the Central Water Commission and the Central Ground Water Board. However, very little attention has been paid to the proper management of our land and soil resources with the result that they have suffered very serious degradation.[120]

The Commission goes on to point out that according to estimates made by the Ministry of Agriculture in March 1980, as much as 175 million hectares out of the country's total land area of 305 million hectares for which records exist are subject to environmental problems.

In the context of India's economic development, environmental protection should be a basic consideration because of the key place of land and water in agricultural production. 'The environment must not be considered,' intones the Planning Commission, 'as just another sector of national development. It should form a crucial guiding dimension for plans and programmes in each sector.'[121] This is the precept; the practice, even with the planners,

is a different matter. Not only has very little attention been given to the environment in planning in the past but, even now, there is no evidence that the urgency of giving top priority to evolving the scientific management of land and water resources of the country in the formulation of our development plans, is being fully recognised. The Seventh Plan Approach Paper stipulated that 'all future development programmes take environmental considerations fully into account' and that 'towards that end, environmental factors and ecological imperatives will have to be incorporated in the design of all departmental projects from the very commencement of their planning.[122] No doubt, this marks an advance over past thinking but it is a small advance which comes nowhere near the requirements of the case. Besides, it is of negative character since it only cautions against causing damage to the environment in designing programmes and projects of development in future planning. On the positive side all it has to offer is that 'the integrated management of resources on a water-shed basis in the hill areas with the participation of the people, needs to be given high priority'.[123] Whether this is going to be an expression of hope or it will be translated into a concrete programme for action, by either the Central or the state governments concerned, remains to be seen. In any case, the gap between the expressed need and the promise by the Plan document is so wide that it would be futile to hope for any tangible improvement on this front given the present amount of concern that planners have on the subject.

The seriousness of the existing environmental situation in the country, on the one hand, and the magnitude of the contribution that a scientific management of land and water resources could make to the agricultural sector of the national economy, on the other, would suggest that the country needs, without further delay, an exclusive perspective plan for this purpose. The plan has to be cast in a much wider framework than mere conservation of the environment. Its approach has to be developmental rather than static, integrated rather than piecemeal, holistic rather than problem and region specific. The plan should be addressed to three main tasks: (*i*) repairing, to the extent possible, the damage already done to the ecological system; reclaiming the land under waterlogging and soil erosion and bringing it back into productive use; and providing vegetation cover against wind and water erosion of the soil in areas prone to such erosion, to escape future

loss; (*ii*) putting the available natural resources of soil, water, land, and forests to integrated optimal use and making such use of resources the base of national plans for economic development; and (*iii*) maintaining a balance between the future growth of the national economy and the conservation of natural environment. The first is related to conservation, the second to development and the third to balancing the short-term and long-term needs of the economy. The three are closely linked to each other and form parts of an integrated whole. The central object is to strengthen and expand the resource base of agriculture which should be the key factor in the growth of the national economy for the next decade-and-a-half.

The base of all plant life is the soil. The quality of the soil determines the volume and variety of crop production on a given piece of land. That quality is not something fixed for all times. Soil is not an inert substance but a fragile and almost living organism of unrivalled complexity. Many billions of living organisms—the micro fauna and the micro flora—can be found in every inch of fertile soil, which are responsible for fixation of atmospheric nitrogen and the breaking down of both organic and inorganic materials into forms suitable for assimilation by plants. The germination of seeds and the growth of plants anywhere are consequently dependent on the quality and richness of the soil in the area. That makes it a national imperative that soil is protected against destruction from imbalances created in the ecological system by human action.

This fact is particularly relevant to the formulation of an irrigation policy and the construction of irrigation works. Soil cannot produce vegetation on its own without being combined with water. For all productive purposes soil is useless without water and vice versa. The problems of soil and water management should thus be seen as an indivisible single whole aimed at optimising the productivity not of the two in isolation of each other, but together. Even so, there is an important difference between land and water. Land exists in a fixed quantity and, but for the minute additions or deductions that might be made by changes in the course of rivers and the receding or advancing of sea water on the shore, the land area is absolutely fixed. On the other hand, water is a renewable resource, the availability of which varies from year to year depending upon nature. It is given to man to control, regulate and manage

the supply of water to get the best out of it by way of agricultural production. This, however, requires that the supply of water in appropriate quantities is adjusted to the needs of the soil for plant production and not vice versa. Water is an indispensable ally of the soil in plant breeding and growth but if mismanaged, it can become its worst enemy causing widespread damage in the form of erosion in some places and waterlogging, salinity and alkalinity in others. It is a good servant but a bad master of the soil.

Viewed in this light, the large surface irrigation projects that the country has constructed over the last thirty-five years come out as mostly ill-conceived and, therefore, in certain ways harmful even to the long-run agricultural interests of the country. Apart from other things, the extensive damage done to valuable soil and the loss of land through waterlogging in the canal irrigated areas is a heavy price that these projects have extracted from the country. The future irrigation policy must take all this into consideration and concentrate on (*a*) remedial measures against waterlogging both in the already affected and the potentially threatened areas in canal irrigated tracts; and (*b*) according far higher priority to minor irrigation works than to large and medium projects.

This could slow down the growth rate of irrigation on which the future hopes of an increase in agricultural production have come to rest and the policy course, therefore, might invite serious objection from most quarters. But a closer look into the problem will convince anybody (except, of course, the vested interests of irrigation departments both at the Centre and in the states) that this is the only sensible irrigation policy for the country to adopt under the present conditions because (*i*) the cost per unit of additional irrigation from canals has already risen so high as to render that form of irrigation severely uneconomical; (*ii*) the loss of land through waterlogging and salinity that have followed in the wake of the spread of canal irrigation is too heavy for the nation to ignore in assessing the benefits of canal irrigation; and (*iii*) canal irrigation encourages bimodal agricultural development while the need of the country is a unimodal pattern of growth or growth in which small and marginal farmers will become equal partners in the increase in agricultural production. There are, of course, ways and means of benefiting small and marginal farmers in areas of canal irrigation also but, apart from the heavy administrative costs involved in ensuring the fair distribution of water among land

holders of all categories situated along the course of the main canal and its distributary channels, it requires institutional reforms which it would not be easy to carry out."

In the land–water relationship, the emphasis of the country must shift now to the efficient management of available water resources for the service of agricultural land. This would include ground, surface as well as rain water. About 70 per cent of Indian agriculture still remains rain-fed. While it is possible to extend the coverage of irrigated agriculture—and the future irrigation policy should aim at that—much greater reliance than in the past will have to be placed on rain water through water harvesting for the growth of agriculture in the arid and rain-scarce areas.

The average annual precipitation (excluding evapro-transpiration and soil moisture storage) has been estimated at 178 million hectare meters (1,780 thousand million cubic meters) which contributes to the surface run-off and the ground water recharge included in the hydrological cycle. Of this, according to the Irrigation Commission's (1972) estimate, only 67 million hectare meters (670 thousand million cubic meters) of surface water and 26 million hectare meters (265 thousand million cubic meters) of ground water are at present utilisable, the rest being unavailable due to a variety of limitations like topography, physiography, geology and the present state of available technology. The optimal use of the available supply of water from this source for irrigation purposes should have received the utmost attention at the hands of planners and policy-makers. But, in actual fact, this has turned out to be one of the most neglected subjects.

Future Land Use Policy

The National Commission on Agriculture estimated that the country would need a net sown area of 150 million hectares and a gross sown area of 210 million hectares in A.D. 2000 to meet the domestic demand for all agricultural produce at that time. This means the country would need to add 6–7 million hectares to the area under cultivation at present, and raise the cropping intensity from the present 123 per cent to 140 per cent. These are not difficult targets to achieve but it can be done only if correct land–water management policies are adopted. A Committee of Experts

appointed by the National Land Resources Conservation and Development Commission has, in this connection, recommended the following guidelines for action by the Central and states governments:

(*a*) Develop a policy for proper land use according to land suitability for different types of utilisation and needs of the country.

(*b*) Incorporate the principles of national land use, safeguards, conservation and management of soil resources into appropriate legislation(s).

(*c*) Develop an institutional framework for monitoring and supervising soil profile management and conservation and for coordination between organisations involved in the use of the country's land resources in order to ensure the most rational choice among possible alternatives.

(*d*) Assess both new lands and the lands already being used for their suitability for different uses and the hazards of degradation; provide decision-makers with alternate land uses which satisfy communities' aspirations and ensure land use according to its capability.

(*e*) For balanced and optimum land use planning, there is an urgent need to promote equitable and comparable planning and development of rural and urban settlements and the integrated development of major and medium industries with small and rural agro-based industries in multi-tier mutually beneficial or complementary systems.

(*f*) It is essential to plan digging up of soils for bricks or for mining and link up some with restoration of beneficial landscape. Such activities can be linked to the creation of permanent community assets (such as, farm ponds or water bodies or recreationary sites).

(*g*) Industries, roads, railways, and so on, in spite of the best planning, disturb the natural balance and encroach upon good forest and cultivable land. Compensatory afforestation and alternate production programmes should be undertaken to ensure that the productivity of agricultural and forest lands lost through unavoidable diversion is restored.

(*h*) The statistics on the potential and availability of water resources to meet the competing demands of agriculture and allied sectors vis-a-vis other developmental sectors are

urgently needed to develop integrated planning to avert a water famine. The quality of this key input must be monitored regularly for productivity and for safe social environments.

(*i*) Implement education, training, and extension programmes at all levels in soil management and conservation and the proper use of land.

(*j*) Disseminate as widely as possible information and knowledge for the land use of all categories of land both at the farm level and of the watershed, stressing the importance of soil resources for the benefit of people and development.

(*k*) Establish and/or strengthen links between government administration at various levels and the land users for the implementation of land use policy through various media and of extension and other measures.

(*l*) Create socio-economic and institutional conditions favourable to rational land use management and conservation. These conditions will include providing security of land tenure and adequate fiscal incentives (such as, subsidy, taxation relief, supply of credit) to the land users.

(*m*) A primary concern of the land use policy should be to continuously increase the productive capacity of the land and to prevent its deterioration. For that purpose, efforts should be made to preserve good agricultural land for agricultural use; diversify the cropping pattern in such a way that the crop best suited to the soil at a particular place is sown there; and encourage mixed farming which means combining crop production with animal husbandry, poultry, bee-keeping and rearing of silkworms and fish and several other allied occupations which ensure year-round employment and income to the small farmer besides adding to the total production of the country.

(*n*) Land-use boards at the state level should be reorganised and activated. These should be given the task of implementing and coordinating land use and conservation policies.

(*o*) Research in land use and development should be encouraged and the results disseminated through extension programmes organised for the purpose.

The Expert's Committee makes detailed recommendations about the follow-up action required, in its view, to implement the guidelines laid down by it. An interesting point made by it, however, is that

> for securing greatest involvement of the farming community in agricultural development, a well-knit, strong and competent organisation of farmers, with units from the grass-root to the national levels, will require to be built up for the purposes of motivating, educating and assisting agricultural production, on the one hand, and cooperating in soil and water conservation and management measures, on the other. Along with official action, the need for people's involvement in the national effort of environmental conservation and putting the natural resources to optimal use, particularly in the field of agricultural production, deserve close attention.[125]

Almost all these proposals of the Committee, however, are generalities. The fact that they do not go beyond and in fact fall short of what the National Commission on Agriculture had recommended in its Report in 1976 on 'Soil and Moisture Conservation' shows how seriously the planners and policy-makers are taking the problem of soil-erosion, floods and deforestation which is getting worse everyday. The Commission was constrained to say: 'No systematic work has so far been done to prepare an inventory of land resources and the problem areas in the country.'[126] Today, more than ten years later, the position remains the same in this respect. Scattered programmes of soil conservation have been carried out in some states but the impact of the work executed has been practically negligible because this was done 'without due regard to interpreted land capability' which was bound to happen in the absence of prior soil surveys.

On the subject of research and training in soil and moisture conservation, the Commission has some very pertinent things to say. On research on watershed management, for instance, the Commission observes:

> Owing to lack of relevant research work in India, workers in this country have so long depended upon research information from other countries which are not necessarily similar in agro-climatic and other conditions. As a result, considerable amount

> of empiricism has been allowed. Experience shows that in the case of watershed management, the borrowing of research results may have drastic consequences.[127]

One could quote a number of other similar observations on the subject from the Commission's Report. But that is not necessary to stress the point that the complex problems of resource and environmental management, which are basic to agricultural and rural development, have not been given the type and amount of attention in planning that, by virtue of their vital importance, was due to them. This neglect is proving costly. The problem needs immediate attention and more coordinated and concerted action for its solution than has been done so far.

8

Summary and Conclusions

Towards A National Policy

Agriculture is the heart of the Indian economy. Besides contributing two-fifths of the GDP and engaging 67 per cent of the country's labour force, the sector feeds and sustains other parts of the economy. The health and growth of the economy depends, in a large measure, on the sound and efficient functioning of the agricultural sector. Or, to turn the metaphor, agriculture is the foundation on which the entire superstructure of the growth of industrial and other sectors of the economy has to stand. Weak foundations would not allow a solid structure to be raised on it.

Such being the importance of the farm sector in the Indian economy, it is surprising that the government has not thought of formulating a well-rounded national policy on agriculture and implementing it systematically. The only national policy statement on agriculture we have is that of 1946, i.e., a pre-Independence vintage.

The new government of Rajiv Gandhi has been busy, ever since its assumption of office, in formulating a national policy on a host of subjects which include education, science and technology, environment, land, water and forest resources, labour, wages, and so on. But nobody has so much as even thought of formulating a national policy on agriculture after Independence or at the beginning of the era of planned development. It was hoped that the present government would make a break with the past in this regard. That hope has been belied.

Under the Constitution, agriculture is a state subject. The Union government has only a peripheral role to play in its development. But this Constitutional nicety is over-ruled by the fact that planning in India is centralised and state plans form an integral part of the Central plan. The plan priorities, policies and the allocation of resources are all decided at the Central level. In addition, there are many Centre-sponsored schemes affecting various aspects of the rural economy and agricultural production. The food policy which touches the very heart of agricultural development in India is formulated and implemented by the Centre. The agricultural price policy is again altogether a Central government affair. The absence of an authoritative statement of an officially accepted national policy on agriculture cannot, therefore, be explained away by the Constitutional position on the divisions of subjects, responsibilities and powers between the Centre and the states. There are other and deeper reasons to explain the relative neglect of agriculture in our national policy-making and development planning.

Growth Model

At the time when Indian planning began in the 1950s the dominant view among development economists was that economic development of a backward poor country (or what was then called an under-developed country) meant its industrialisation. At the back of the minds of development economists was the historical experience of West Europe and North America. At the same time, there was the example of Soviet Russia which in less than three decades after the Socialist Revolution had transformed itself into a mighty industrial power with the help of a system of centralised planning. Development economics of the West and the precept of planning from the USSR gave us the working concepts of a mixed economy and national planning.

The theoretical argument behind giving the highest priority to industrialisation was that the primary need of the underdeveloped countries was to raise their savings rate from the prevailing low 6–8 per cent level to a 15–18 per cent level. The latter rate of investment was considered to break the barrier of stagnation and bring the economy to the 'take-off stage'. The key factor in the economic

development process was viewed to be the rate of savings and investments. This objective, it was further argued, was best achieved by developing a strong capital goods industry sector in the earlier stages of the growth process because it is this sector which afforded the opportunity for achieving the highest rate of capital accumulation. For development what was really needed, therefore, was not just starting of a few industrial units manufacturing consumer goods, but the establishment of basic key and mother-machine industries that would generate new industries. Thus, in the words of Jawaharlal Nehru:

> If you want India to industrialise and to go ahead as we must, as is essential, then you must industrialize and not putter about with old little factories producing hair oil and the like—it is totally immaterial what the things are, whether they are small or big consumer articles. You must go to the root and the base and build up the structure of industrial growth. Therefore, it is the heavy industry that counts, excepting as a balancing factor which of course is important. We want planning for heavy machine-making industries; we want industries that will make heavy machines and we should set about them as rapidly as possible because it takes time.

This was said at the meeting of the National Development Council held to finalise the Second Five Year Plan in January 1956. It neatly sums up the theory as well as the growth model that India adopted at the beginning of the Second Plan. Actual experience of working with that model proved so instructive that, within eight years, Nehru was forced to admit at the meeting of the National Development Council on 8 November 1963 that in the Indian context:

> Agriculture is more important than anything else not excluding big plants, because agricultural production sets the tone to all economic progress. If we fail in agriculture then we fail in industry also .... *Agriculture is more important than industry for the simple reason that industry depends on agriculture.* Industry which is no doubt important will not progress unless agriculture is sound and stable and progressive (emphasis added).

This was a complete reversal of the position taken up by him less than eight years earlier. In the learning process, he had moved far ahead of the tribe of development economists, who had by then only managed to move from the heavy industry to the import-substitution model of industrialisation and economic growth. Pt. Nehru did not live long thereafter to give practical shape to the new ideas by incorporating them into the next five year plan, which itself was delayed by three years of plan holiday. Meanwhile, Nehru's views on the primacy of agriculture in India's development exercise had been forgotten and, but for some verbal expressions of support for the agricultural sector, the Fourth Plan was not very different in its growth strategy from its two predecessors. In fact, as has been shown earlier, there was greater erosion of farmer income in the seventies because of the effects of the adverse development policies pursued at the macro-economic level, on the one hand, and some external factors (like the crude oil price hike by the OPEC), on the other.

Events continued to run ahead of economic theory. Development economists came out in the seventies with an exports-led growth model, which owed its origin to the success achieved by newly industrialising countries of South-East Asia (like Taiwan, Korea, and Singapore). Meanwhile, impressed by the fact that in the present situation industrialisation could not solve the basic problems of poverty and unemployment, the World Bank authorities and experts began to talk of making a direct assault on poverty by giving high priority in the development plans of the poor countries to projects that would supply the basic minimum needs of the poorer sections of population. Food, drinking water, elementary education and primary health services were identified as the basic minimum needs and the Bank began to orient its lending policies to the funding of projects aimed at supplying the basic minimum needs, particularly in the rural areas, in the developing countries. India's Draft Sixth Plan drawn up by the Janata government had as its main objects the removal of poverty and unemployment within a time frame of ten years and the creation of conditions in which the basic minimum needs of the total population are met. The plan was scrapped with the fall of the Janata government.

Though lone voices were raised earlier, it is only recently that a

consensus has started emerging among the mainstream development economists that agriculture holds the key to economic growth in the developing countries. Hans Singer, writing in 1979 that there is little prospect of the developing countries achieving the Lima targets of taking their share of world industrial production from 7 per cent in 1975 to 25 per cent in 2000 under the existing policy framework, called upon them to base, henceforth, their 'national development on agriculture as the primary sector and developing industries with strong emphasis on agriculture industry linkages and interactions.'[128] The World Bank in the *World Development Report 1982* came out with similar advice to the developing countries. A World Bank Staff Paper[129] in November 1983 made a strong plea that agriculture be accorded the highest priority in the development plans of the developing countries. Irma Adelman came out in 1984 in favour of the adoption of what she calls an agricultural-demand-led-industrialisation (ADLI) strategy[130] by the developing countries. Though Scitovsky has called Adelman's paper an attempt 'to introduce a new fashion into development policy'[131] the approach advocated in the paper is not all that new. Among contemporary economists, Schultz and Mellor have long advocated the adoption of that strategy by India and other developing countries. Paul Streeton, Hirshman and de Janvry are among the more recent converts to that view.

The *World Development Report 1986*, the annual publication of the World Bank for the last nine years, focuses on agricultural policies because in the Bank's view 'success in agriculture will . . . largely determine economic growth in many low-income developing countries and help to alleviate poverty in rural areas, where most of the world's poorest people live.'

Among the older economists, the lineage of the strategy can be traced back to Adam Smith. The 'natural order' of economic growth of a nation, according to *The Wealth of Nations*, was agriculture, industry and commerce. This was so because the limits to the economic growth of a country in a closed economy framework, Adam Smith maintained, were set by the growth rate of agricultural sector which supplied the needed food and raw materials to maintain the labour force engaged in non-agricultural occupations. Though in a different way, Malthus and Ricardo also assigned an important place to agriculture in their growth models.

Climate for Change

It may be a happy coincidence, or perhaps India's experience has something to do with it, that world thinking on the development strategy that the developing countries should adopt under the present conditions, has started undergoing a radical change. The watchword for development today is agriculture, as against industrialisation which was the case in 1950s and 1960s.

> In financial ministries around much of the world, in ivory towers from Beijing to Boston and in Washington, development strategies have been turned upside down. Old ideas have become widely discredited. Farmers, not industrial tycoons, are now seen as the pivotal figures who can help to pull their countries from the mire of indigence.[132]

That this change in world thinking on the subject should come about at a time when the need for a change in the development strategy underlying Indian planning has become most urgent, is extremely fortunate. For, in the absence of such a powerful support from development theorists and practitioners alike the world over, any suggestion to the planners in this country from an individual or a group of economists for changing the development strategy in favour of agriculture, would have, even now when the need for the change is obvious, hardly evoked a positive response. It might have been outright rejected, if not derided, by the planners. Not that it is going to receive a whole-hearted welcome or easy acceptance from them or from the politicians immediately even now. It will be foolish to entertain any such illusions. All that the present study can hope to achieve is that a national debate is started and powerful professional and public opinion built up in favour of the policy line suggested here so that the policy-makers and politicians are forced to sit up and take notice of the need for change in the development strategy.

Effort in that direction is necessary because in the matter of planning, while the country seems to have reached a dead end in the process of growth, the planners and politicians continue to suffer from misconceptions, outdated beliefs, and worn out economic dogmas that have lost their credibility. The mental inhibitions from which they suffer need to be removed before we can expect them to act.

At present, the work of the Planning Commission has come to be reduced to screening and approving the Union economic ministry's and state government's plan proposals and projects sent to it for inclusion in the five year plans and then write a plan document to be presented first to the National Development Council and then to Parliament for approval. All this has become such a routine and, with the file work added to it, time-consuming affair that members of the Commission are hardly left with any time for fresh thinking, individually or collectively, on basic issues of the growth strategy and related matters. Even different chapters in a plan document are prepared separately with the help of their respective staff by each member, according to the subjects dealt by him. Any coordination that may be needed between the chapters is left to the Deputy Chairman. All the work in the Planning Commission has become so routinised—the bureaucrats would call it systematised—that there is hardly any scope left for fresh and collective thinking on the part of the Commission on the real issues in the development of the economy. In the circumstances, it is difficult to even imagine that the initiative for a change in the development strategy would come from the Planning Commission. All that it can give is the seventh approach to the same plan—as was remarked by the late Raj Krishna—and not a much-needed new approach to planning in the Seventh Plan. To force it to do so, at least the necessary intellectual climate will have to be built up outside Yojna Bhawan.

Even more difficult than the Planning Commission is to persuade the political elite to act in the matter in the desired direction. While there is enough or even a surfeit of political rhetoric in the press and on the platform about its concern for the welfare of the agriculturists, weaker sections of the society, Scheduled Castes and Scheduled Tribes, Backward Classes, and for the development of the agricultural sector and rural economy, the fact remains that the ruling elite in India is almost wholly urban in its composition. It has a vested interest in the development of modern large-scale industry, trade, and all the infrastructure required to support these sectors. Besides, its perceptions of development are the development of the modern sector of the economy and of all that goes with it. It sees and measures development in terms of westernisation of the economy and the society. 'One of the great mistakes made in the years following the second World War when

there was great enthusiasm for development,' Galbraith has said recently, 'was for developing countries to assume that they can jump from a rural society directly to urban industry.' These countries felt, at the time, that 'if you don't have a steel mill or a machine tool plant, you were not there'. Now that steel mills, machine tool plants and various other frills of a modern industrial economy have been built and the whole approach has been found wanting in terms of providing answers to the country's chronic economic problems of poverty, unemployment, disease and destitution, one would expect that the elite itself realises the mistake in its past notions and mends its thinking. But Western thought and philosophy are so deeply ingrained into the intellectual make-up of the country's elite that these prevent this from happening. Again, the elite may have genuine sympathy for the poor and even genuine interest in poverty alleviation in the countryside but it cannot easily understand how the growth of productivity in millions of small farms would remove poverty. For it, the only way to alleviate poverty is to build up a strong modern industrial sector and let its effects in due course trickle down to the rural masses. Meanwhile, apart from other things, it is a political necessity that the poor farmers, the landless labourers and other indigent sections of the rural population are kept in good humour. They form the majority of Indian voters and their support is necessary for the ruling elite to keep itself in power. This explains why it becomes necessary to have special poverty alleviation programmes as a part of a five year plan.

We have gone on with a system of planning and a development strategy which have begun showing signs of breakdown under the weight of their own contradictions and constraints. Difficulties with continuing with the present system of planning have already started coming to a head, as is clear from the difficulties that have arisen in regard to financing of the Seventh Plan. As for the development strategy, it has created so many and such great intersectoral and intra-sectoral imbalances in the economy that the economic ministries of the government are finding it increasingly difficult to cope with them. All this at least gives hope that there is a chance that the advice about giving a new deal to agriculture in the country's development planning and policy-making may receive better attention now from the ruling elite than would have been the case in the past.

Recapitulation

The kind of policy changes in the agricultural field that are called for in the present situation and the reasons have been spelt out in the foregoing pages of this book. It remains now to bring together, at one place, the various strands of thought and summarise the policy conclusions.

1. India has registered, over the last thirty-five years, significant gains in the production of foodgrains and various commercial crops (including cotton, jute and sugarcane). The trend growth rate of around 2.6 per cent per annum from 1950–51 to 1983–84 has kept ahead of the demographic growth rate so that the per capita availability of foodgrains has shown improvement over the years. More importantly, the country has ceased to be dependent on imports of foodgrains for running its public distribution system and has today, at least in good crop years, a sizeable export surplus. It is one of the few developing countries to have a comfortable size of buffer foodstocks for the purpose of food security.

2. While all this looks impressive, the growth has not been without several flaws. First, it has been, spatially, a case of uneven growth with the result that an acute degree of inter-regional disparity in crop yields and production has now come to characterise Indian agriculture. Secondly, while because of the weather factor, variations in crop production are a natural phenomenon, the degree of fluctuations in the last two decades has shown a disconcerting increase. Thirdly, the gains made by the country in cereal production have been mainly in wheat and rice. Production of coarse grains has shown only a modest increase in the last thirty-five years. This development has an important implication. Coarse grains were earlier produced, mainly in the rain-fed and dry-farming areas for domestic consumption mostly by the small and marginal farmers. The failure of production of these grains to keep pace with the growth in population, together with the food policies pursued by the government, have resulted in making the poorer sections of the farming community dependent for their consumption needs on the market or on the public distribution system where available.

Fourthly, while cereal production has grown, that of pulses, which are the main source of protein in a vegetarian diet, has remained more or less constant since Independence, resulting in a

sharp decline in the per capita availability of pulses over the last thirty-five years. Fifthly, the production of oilseeds has greatly lagged behind growth in demand, making the import of edible oils a major item in the import trade of the country. A more balanced agricultural growth could have saved the country more than Rs. 1,000 crore spent on the import of edible oils, in its annual import bill. Finally, the pattern of growth has divided Indian agriculture into two almost independent entities—the modern and the traditional. The former has all the advantages: irrigation facilities, preferential supply of fertilisers, seeds, power and diesel; price support; and organised marketing (including extensive procurement operations organised by the government reaching literally the doorstep of the farmer). The latter, on the other hand, has comparatively suffered neglect at the hands of the planners and policy-makers because they found it easier to achieve the needed production targets by concentrating the available resources on areas that promised quickest results rather than spreading them thinly over the entire length and breadth of the country. Development of agriculture has thus followed a bimodal pattern of growth which has characterised the development of the Indian economy as a whole: a capital-intensive, technologically advanced, modern and growing sector existing side by side with the traditional, capital deficient and labour surplus, low productivity and low income and more or less stagnant sector, with little trickling of the elements of progress and growth from the former down to the latter.

3. The green revolution represented a technological thrust towards boosting foodgrains production. The 'wonder' seed was the catalyst which, combined with use of chemical fertilisers and the availability of irrigational facilities, caused an impressive increase in crop yields. But the technology and the new agricultural strategy adopted at the time could not have achieved the success these did without the backing of appropriate agricultural policies. Even as the decision to import high-yield Mexican wheat seed was taken, a 15 per cent increase in the procurement price of wheat was simultaneously decreed by India's Cabinet. The incentive prices offered to the farmer was an important contributory factor to the success of the seed-fertiliser technology in the country. But the immediate gains in yields and output after the introduction of the new technology made the policy-makers complacent about the

need to continue offering incentive prices to the farmer for sustaining his interest in the use and spread of new technology to other parts of the country. It is the ambivalence over a proper agricultural price policy that was responsible for the grain production in the country growing by fits and starts since the beginning of the green revolution. The pattern of growth over the last two decades has been such that a few years of impressive growth have alternated with similar terms of stagnation. The latter have coincided not only with spells of adverse weather conditions but also, and even more significantly, with years of adverse input-output price ratios, particularly the ratio between fertiliser prices and procurement prices of cereals fixed by the government. This has prevented the benefits of the seed-fertiliser technology from being fully realised by the country.

4. Studies in the agrarian economy of the country suggest that there is a close inverse relationship between agricultural progress and the incidence of poverty. In the areas of high agricultural growth like Punjab and Haryana, the proportion of people living below the poverty line is lowest in the country. However, since the green revolution in India has remained confined to only one region, agricultural progress has failed to make any significant dent into the problem of rural poverty in the country as a whole.

5. Similarly, while the increase in cereal production has made the country self-sufficient in food supply and brought it to a point where everyone in it has *physical* access to the food he wants, about half of the population lacks the *economic* access to food and continues to be underfed and under-nourished. This has given rise to the paradox that while the country has, on the one hand, an uncomfortably high level of buffer stocks that have begun proving burdensome economically, on the other, about half the population continues to suffer from partial hunger because it lacks the means to buy the needed food.

6. In the Indian case, agricultural growth holds the key to the alleviation of the problems of poverty and unemployment. Realisation is growing now among agricultural economists in India and abroad that problems of poverty and unemployment, which are largely problems of rural poverty and surplus labour in agriculture, can be adequately tackled only through a radical change in the development strategy. The bimodal pattern of development resulting from the growth model adopted for planning since the begin-

ning of the Second Plan has failed, among other things, to solve the basic economic problems. On the contrary, it has helped to accentuate inequalities and income disparities between different sectors of the economy and different regions of the country. Broadly speaking, while the capitalistic and tertiary sectors have grown in size and incomes, the traditional agricultural sector has practically remained unaffected by the growth impulses and shown little improvement in productivity and income levels.

7. What India needs is a growth strategy based on agriculture as the core of the whole process of development. Reduction of malnutrition and related manifestations of poverty requires setting into motion a set of interacting forces that link nutritional need, the generation of effective demand for food on the part of the poor, increased employment, and growth in agricultural productivity. Only a strategy of development that structures demand towards goods and services that have a high employment content, production of wage goods, and an emphasis on growth in agriculture can accomplish this. Not only that. The dynamics of rural demand generated by a unimodal pattern of agricultural development would foster a far more rapid growth of output and employment in manufacturing and other non-farm sectors and, therefore, result in a far higher growth rate of the GDP than achieved under the bimodal strategy followed so far. The late Prime Minister, Indira Gandhi, had desired that the Seventh Plan should have three objectives: food, employment and productivity. This desire could be translated into action only by bidding farewell to the capital-intensive dualistic strategy of growth and the adoption of an unimodal strategy based on the rapid growth of agricultural and rural incomes and, consequently, a rising rural demand for goods and services.

8. The country needs a policy change both *towards* agriculture and *on* agriculture. A change of policy *towards* agriculture means that the farm sector of the economy has to be put in the lead in the development process. It is to be given primacy in the allocation of plan resources and the provision of infrastructural support. Instead of being looked upon as a source of supply of wage goods, industrial raw materials and export earnings for the rest of the economy, it is to be made the base and fountainhead of all economic activity in the country. Together with providing sufficient food to meet the nutritional needs of the total population, the

sector is to be the principal source of employment and income in the economy. The growth impulse in the economy is to emanate from agriculture and its growth rate is to be the determinant of the growth rate of the economy as a whole. It is to form the base, and the industry and tertiary sectors the superstructure of the national economy. Since the strength of a structure lies in the solidness of the foundations on which it is raised, the terms of trade between agriculture and industry are to be tilted in favour of the former as a matter of policy and economic planning. However, care is to be taken to see that increased agricultural production is based on cost-decreasing technological change. Favourable terms of trade are to be accorded to agriculture not as a protectionist measure but as a pump for keeping the growth engine constantly fuelled. A symbolic but at the same time very important gesture would be to entrust the agriculture portfolio both at the Centre and in state Cabinets, to the top partymen of the ruling party so that the portfolio commands the necessary prestige in decision-making by the government from the top down to the district level and in the country's entire administrative set up. In this connection, the recent decision to make the Union Minister of Agriculture and Rural Development a member of the Planning Commission is a highly welcome and significant development.

Of equal, if not greater, importance in this connection is the need for changing the urban bias in our fiscal, monetary, credit and trade policies. All these policies, at the macro-level, have operated in the past in a way that is prejudicial to capital accumulation and the growth of the agricultural sector. The constant drain of income and resources from it to which the farm sector has been subjected so far in the name of economic growth and modernisation, should now stop. On the contrary, these policies should, in future, be so formulated that these promote capital investment and help in the growth of the agricultural sector.

As for policies on agriculture, the most important things to do are: (*i*) provide the necessary technological thrust to farming into parts of the country that have unirrigated agriculture; (*ii*) rationalise the system of subsidies so that only small and marginal farmers and agriculturally depressed areas get the benefit; (*iii*) ensure a regular flow of supplies of inputs like HYV seed, fertiliser and pesticides in adequate quantities; (*iv*) arrange for the supply of institutional credit to the small and marginal farmer; (*v*) implement

vigorously at least the basic minimum land reform measures relating particularly to tenancy and consolidation of fragmented holdings; (*vi*) revise the irrigation policy, shifting the emphasis from construction of major and medium irrigation works in the public sector to minor irrigation works, better management of the distribution of irrigation water in command areas and introducing more scientific and better water management practices in the rain-fed and dry-land farming areas; and (*vii*) devise an agricultural price policy that, while obviating the distortions and imbalance in the cropping pattern that have, of late, become characteristic of agricultural production in the country, will encourage growth and, at the same time, produce a balanced cropping pattern.

9. The agriculture-growth based development strategy does not come into conflict with the current drive in the country for modernisation and preparing it to enter the twenty-first century as a technologically and economically advanced nation. It actually supplements and supports that drive making it more comprehensive of the Indian economy than it would be if it were limited to select fields of computers, electronics and a few high technology capital-intensive industries. Without insisting on the simultaneous modernisation of agriculture (the largest single sector of the Indian economy) when going in for high technology in the manufacturing field, the existing dualistic economic structure with all its inequalities and distortions would continue. This, in turn, would even prevent the full potential of technological development from being realised.

10. The adoption of agriculture and a rural development-based growth strategy would change the complexion of planning in India. The present highly centralised system of planning would give way to decentralised planning. The district would become the basic unit of planning. District plans would be drawn up by the local (district) administration in full consultation with the people through their chosen representatives in the panchayati raj institutions of the district. The state-level part of the five year plan will coordinate the district plans in the state and provide for programmes and projects of development that are of common benefit to all the districts and the state as a whole. The Central all-India plan would, similarly, be an aggregation of state and Union Territory plans besides containing development projects and programmes of the Central sector. The whole process of planning

would thus be reversed: instead of travelling down from the Centre to the states and from there to the districts, the plan would travel up from district level to the state capitals, and from there to the Centre. This would naturally require considerable devolution of financial resources and powers from the Centre to the states and the districts. Such devolution will not only promote economic growth and strengthen the economy but would also help in building more harmonious Centre–state relations and, through it, a strong federal polity.

11. In any perspective planning of agricultural development, land and water resource development should occupy the top place. Unfortunately, in India, this has been one of the most neglected aspects of policy planning for the agricultural sector till today. Of late some attention has come to be paid to the conservation aspect of the ecology, especially the conservation of forests in the Himalayas and other hilly areas. But the action in the matter still remains confined to a review of the problem by expert groups and commissions and setting up of the National Land Resources Conservation and Development Commission. A beginning in making a serious dent into the problem at the ground level still remains to be made.

However, even if all the attention were given to the conservation of the natural environment, that would not be enough to meet the need of the existing situation. The whole problem of soil and water conservation has to be seen in the developmental context. For that, it is necessary that the country has an exclusive perspective plan of conservation and development of natural resources to strengthen the resource base of agriculture. The plan has to be cast in a much wider framework than the mere conservation of the environment. The approach should be developmental rather than static, integrated rather than piecemeal, holistic rather than region and problem specific. The plan should be addressed to the accomplishment of three main tasks: (*i*) repairing, to the extent possible, the damage already done to the ecological system; reclaiming the land suffering from waterlogging and soil erosion and bringing it back into productive use; and providing vegetation cover against wind and water erosion of the soil in areas prone to such erosion, to escape future damage; (*ii*) putting the available natural resources of soil, water, land and forests to integrated optimal use and making such use of resources the base of national

plans of economic development; and (*iii*) maintaining a balance between the future growth of the national economy and the conservation of the natural environment as well as keeping the land and soil resources in proper health.

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